

# THE IRON AGE

A Review of the Hardware, Iron, and Metal Trades.

Published every Thursday Morning by David Williams, Nos. 90

& 102 Reade St., New York.

Vol. LIV: No. 10. New York, Thursday, September 6, 1894.

\$4.50 a Year, including Postage.  
Single Copies, Ten Cents.

Reading Matter Contents.....page 416  
Classified List of Advertisers... " 109  
Alphabetical Index to Advertisers " 114  
Advertising and Subscription Rates " 423

**SHULTZ BELTING CO.**  
MANUFACTURERS OF  
**SHULTZ PATENT SABLE**  
THE MOON SPIN LINE A TOP  
TANNED SURFACES  
ONLY.  
INTERIOR  
RAWHIDE  
NONE  
GENUINE  
WITHOUT  
"SABLE"  
STAMPED EVERY  
TEN FEET

Send for circular "I" to  
**SHULTZ BELTING CO.,**  
ST. LOUIS, MO.  
NEW YORK, N.Y., 113 Liberty St., A. B. Laurence, Mgr.  
BOSTON, MASS., 164 Summer St., G. J. Kelley, Mgr.  
PHILADELPHIA, PA., 129 N. 3d St., J. Garnett, Mgr.

**TUDOR IRON WORKS,**  
ST. LOUIS.  
Manufacturers of  
**HARROW TEETH, MINING RAILS,  
SPIKES,  
TRACK FASTENINGS.**

Great Reduction in Prices of Bristol's Patent  
**STEEL BELT LACING.**  
Send for show card, circular and freesamples.  
READY TO APPLY FINISHED JOINT  
**THE BRISTOL CO., - Waterbury, Conn.**  
New York Office, 121 Liberty St.

**BRAIDED CORD.**  
Samson and Massachusetts Brands.  
Send for Samples.  
**SAMSON CORDAGE WORKS, Boston, Mass.**  
**TURNBUCKLES.**

BRANCH OFFICE: 136 Liberty St., New York.  
Cleveland City Forge and Iron Co., - Cleveland, O.

**"DODD'S"**  
**LIQUID GLUE.**  
A. W. DODD & CO., Gloucester, Mass.

**RHODE ISLAND TOOL CO.,**



**PROVIDENCE, R. I.**

**U.M.C. PINK EDGE** **U.M.C. TRADE MARK** **U.M.C. BLACK EDGE**

## Gun Wadding

SUPERIOR TO ALL IMPORTED WADS.  
Black Edge, Pink Edge, Card Board, White Felt.

**The Union Metallic Cartridge Co.,**  
**BRIDGEPORT, CONN.**

**RANDOLPH & CLOWES,**

**WATERBURY, - CONN.**  
Western Depot, 71 West Washington St., Chicago, Ill.  
104 John St., New York.  
Room 320 Phila. Bank Bldg., Phila., Pa.  
Branch Offices: 99 Milk St., Boston, Mass.  
Room 208 Neave Building, Cincinnati, O.

**SEAMLESS DRAWN BRASS AND COPPER TUBING.**  
Hot and Cold Rolled Sheet Copper and Brass of all kinds.

**JENKINS' Standard Packing** Is Guaranteed Tight  
On your Worst Joint,  
Or Money Refunded.

**JENKINS BROTHERS,**  
NEW YORK. BOSTON. PHILADELPHIA. CHICAGO.

**The Wilmot & Hobbs Mfg. Co.,**  
BRIDGEPORT, CONN.  
24 MURRAY ST., NEW YORK.  
(CONNECTED BY TELEPHONE)  
C. E. SWEDOR STEEL RUST OILERS,  
LAMPS, FILLERS, TALLOW POTS, TORCHES,  
ENGINEERS AND STEAMBOAT SETS, ETC.  
Are CHEAP, DURABLE and ELEGANT and are all  
Heavily Electro-Copper Plated Inside to Prevent  
Rusting and the Oil from becoming dirty. The Out-  
side of the "Copperized" Oiler Perfectly Resembles  
Burnished Copper. Buy the best—cheapness in the  
end. Send for Catalogue "G."

**BRIGHT COLD ROLLED STEEL**  
FOR ALL KINDS OF  
Stamping and  
Plating Purposes.

**BESEMER, OPEN HEARTH, and the Celebrated and Unquestioned "SWEDOR" STEEL**  
Hot Rolled and Cold Rolled  
For Pressed, Stamped and Drawn Work.

**Rainey Connellsville Coke.**  
Furnace and Foundry  
The only Coke you can buy and know you are getting the best that can be manufactured. All our works in the heart of the Region, within four miles of Connellsville, Pa.  
**CAPACITY 4,000 TONS DAILY.**  
**W. J. RAINEY,** MAIN OFFICE: **CLEVELAND, OHIO.**  
Mercantile Bank Building.

THE  
**ANSONIA BRASS**  
AND **COPPER Co.**  
MANUFACTURERS OF  
**BRASS AND COPPER**  
Seamless Tubes, Sheets, Rods and Wire.

**Ingot Copper.**

SOLE MANUFACTURERS

**Tobin Bronze**

(TRADE-MARK.)

Condenser Plates, Pump Linings, Wire, Round,  
Square and Hexagon Bars, for Pump  
Piston Rods and Bolt Forgings.

19 & 21 Cliff Street, - - New York.

THE  
**New Haven Copper Co.,**  
SOLE MAKERS OF

**POLISHED COPPER**

Under Patent of T. James, Sept. 12, 1876.

ALSO MANUFACTURERS AND

DEALERS IN

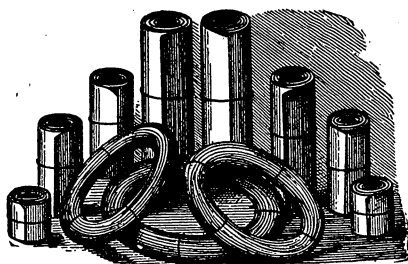
**BRAZIERS' & SHEATHING COPPER,**

Kettles, Bottoms, Bolts, Circles, &c.,

ALSO MANUFACTURERS OF

Cast Steel Augers and Bits of Superior Quality.

294 Pearl St., NEW YORK.



**Waterbury Brass Co.**

Established 1845.

Sheet, Roll and Platers' Brass,

German Silver, Copper, Brass and Ger-  
man Silver Wire, Brass and  
Copper Tubing,

**COPPER RIVETS AND BURS**  
**PERCUSSION CAPS,**  
**TAPE MEASURES,**  
**METALLIC EYELETS,**

Brass Kettles, Brass Tags, Powder Flasks,  
Shot Pouches, &c.,  
AND SMALL BRASS WARES OF EVERY DESCRIPTION.  
HICK'S PRIMERS. BERDAN PRIMERS.

*Cartridge Metal in Sheets or  
Shells a Specialty.*

Sole Agents for the CAPEWELL MFG. CO.'S  
Line of Sporting Goods.

DEPOTS:

296 Broadway, New York. 125 Eddy St., Provi-  
dence, R. I. 38 Mechanic St., Newark, N. J.  
MILLS AT WATERBURY, CONN.

WHEN IN WANT OF  
ANYTHING IN

**BRASS**  
AND  
**COPPER**

WRITE

**ROME BRASS & COPPER CO.,**  
**ROME, N. Y.**

**MATTHIESSEN & HEGELER ZINC CO.,**

LA SALLE, ILLINOIS,

**SMELTERS OF SPELTER**

AND MANUFACTURERS OF

**SHEET ZINC AND SULPHURIC ACID.**

Special Sizes of Zinc cut to order. Rolled Battery Plates.

Selected Plates for Etchers' and Lithographers' use.

Selected Sheets for Paper and Card Makers' use.

Stove and Washboard Blanks.

**ZINCS FOR LECLANCHE BATTERY.**

**BRASS GOODS MFG. CO.,**

Mfrs. of Stamped Brass, Silver and Nickel Goods, Brass Labels for Cans and Rubber Moulds,

**BRONZE DOOR KNOBS**

Bronze and Plated Roses, Combined Rose and Escutcheon Plates, Socket Shells, &c., Patent Mirror Pin  
Cushion Business Cards, Mucilage Brushes. Novelties of new design made to order.

SALESROOM: 88 Chambers St., New York. FACTORY: 86-92 Third St., So. Brooklyn.

MANUFACTURERS OF  
 Drop Hammers, Turnbuckles and Paral-  
lel Vises.

MERRILL BROS., 465 to 471 Kent Ave., Brooklyn, E.D., N.Y.

**HENDRICKS BROTHERS,**

Proprietors of the

**Belleville Copper Rolling Mills,**

Manufacturers of

**Braziers', Bolt and Sheathing**

**COPPER.**

**COPPER WIRE AND RIVETS.**

Importers and Dealers in

Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.  
49 CLIFF ST. NEW YORK.

**THE PLUME & ATWOOD MFG. Co.**

MANUFACTURERS OF

**Sheet and Roll Brass**

-AND-

**WIRE,**

GERMAN SILVER AND GILDING METAL,  
COPPER RIVETS AND BURS, COP-  
PER ELECTRICAL WIRE,

Pins, Brass Butt Hinges, Jack Chain,  
Kerosene Burners, Lamp  
Trimnings, &c.

18 MURRAY ST., NEW YORK.

71 PEARL ST., BOSTON.

90 MARKET ST., CHICAGO.

ROLLING MILL,  
THOMASTON, CONN.

FACTORIES:  
WATERBURY, CONN.

**SCOVILL MFG. COMPANY,**  
Manufacturers of

**BRASS**

Sheet, Wire, Tubes.

**BUTT HINGES,**  
**BUTTONS,**  
**LAMP GOODS,**  
**NOVELTIES,**  
**PURE ALUMINUM**

INGOT and SHEETS.

FACTORIES, WATERBURY, CONN.

DEPOTS:

428 Broome Street, New York.  
210 Lake Street, Chicago.  
84 Summer Street, Boston.

**JOHN DAVOL & SONS,**

AGENTS FOR

Brooklyn Brass & Copper Co.,

DEALERS IN

**COPPER, TIN, SPELTER,**  
**LEAD, ANTIMONY.**

100 John Street. - New York.

**WILLIAM S. FEARING.**

100 Chambers St., NEW YORK,

SELLS TO THE TRADE

*Sheet Brass, Fancy Sheet Brass,*  
*German Silver, Copper, Brass*  
*and German Silver Wire,*  
*Brazed and Seamless Brass and*  
*Copper Tubes, Brass and Cop-*  
*per Rods, Brass Ferrules,*  
*Pure Copper Wire,*  
*Sheet and Ingot Copper, Spelter,*  
*Tin, Antimony, Lead, &c.*

The Williams

Printing Co.,

Commercial Printers,

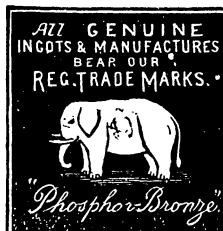
and Binders.

Estimates Furnished for all Classes of Work.

96-102 Reade St., - New York.



**ELEPHANT  
BRAND**



**PHOSPHOR-BRONZE**  
INGOTS, CASTINGS, WIRE, SHEET &C.  
THE PHOSPHOR BRONZE SMELTING CO. LIMITED  
2200 WASHINGTON AVE. PHILADELPHIA, PA.  
ORIGINAL MANUFACTURERS OF PHOSPHOR-  
BRONZE IN THE UNITED STATES AND SOLE  
MAKERS OF "ELEPHANT BRAND" PHOSPHOR-BRONZE.

**PHOSPHOR  
BRONZE.**

**Parsons' Manganese Bronze and White Brass.**

MADE IN THE UNITED STATES EXCLUSIVELY BY

**THE WILLIAM CRAMP & SONS SHIP and ENGINE BUILDING CO.,  
PHILADELPHIA, PA.**

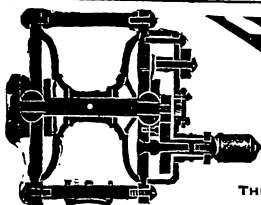
**MANGANESE BRONZE PROPELLERS**

—ARE USED BY THE—

Cunard, Pacific Mail, Hamburg American, White Star, International,  
Morgan, Canadian Pacific, North German Lloyds and many  
other Steam Ship Companies, and principal Naval Powers.

**Parsons' White Brass; the Most Approved Anti-Friction Metal.**

G. DOUGLAS PETRIE, Agent, - Nos. 39 & 41 Cortlandt Street, New York.



Solicits Correspondence about  
Fishing Reels for 15 Cents to 20 Dollars each.  
Brass Bird Cages " 50 " " 12 " "  
Japanned " " 25 " " 10 " "  
Standard Bronze, Brass and Steel Chain.  
Standard Wire Picture Cord.

THE ANDREW B. HENDRYX CO., NEW HAVEN, CONN., U. S. A.



**THE F. L. GAYLORD CO.,**

MANUFACTURERS OF

Heavy and Light Brass, Bronze, Composition and Pure  
Aluminum Castings.

THOS. L. FOWLER & CO., Agents, 55 Fulton St., New York City.

**CROWN SMELTING COMPANY,**

Chester, Pa.

**Bronze, Brass and Composition Castings.**

Inventors and Sole Manufacturers of

**"Crown Bronze" Bearing Metal and "Crown ROLLING MILL Babbitt Metal."**

Manufacturers of PHOSPHOR-BRONZE TO PENNSYLVANIA RAILROAD.

Specifications in ingot metal or castings.

**The W. W. & R. M. KEYS CO.,**

Bronze,  
Composition  
and  
Brass  
Castings  
of all kinds,  
also  
Babbitt  
Metals.

**BRIDGEPORT, CONN.**



Guaranteed  
Best Anti-Friction Metal for all machinery bearings.  
For high speed and heavy crushing weight it has no  
equal. It is used on bearings where no other known  
metal will stand.

Theo. Hiertz & Son, Sole Mfrs.,  
30th St. and Park Ave., St. Louis, Mo.

Manufacturers all grades Babbitt Metals, Solder, Bar Tin, Bar Lead, Lead Car Seals, etc.

**Boston Casting Co.,** 122 W First St.,  
So. Boston, Mass.

MANUFACTURERS OF

**WROUGHT IRON  
CASTINGS.**

We make sound, soft Wrought Iron Castings with  
a tensile strength of 60,000 to 70,000 pounds per  
square inch and guarantee the same to be expressly  
adapted for mechanical and electrical work. The  
castings will be true to pattern with a shrinkage of  
one quarter of an inch to the foot. This company  
is in no way connected with any other.

A

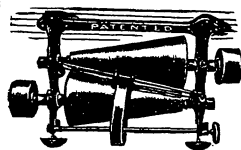
**ACID RESISTING  
Deoxidized Bronze,**

Copper or Brass, also Aluminum, Phosphor Bronze  
and Compositions of all kind in Ingots,  
Wire Bars and Castings.

**LARGE CASTINGS A SPECIALTY.  
BABBITT METALS.**

BRIDGEPORT DEOXIDIZED BRONZE AND METAL CO.,  
Bridgeport, Conn.

**EVANS FRICTION CONES.**



For regulating the  
speed of machines au-  
tomatically or by hand.  
Thousands of sets in  
operation driving all  
kinds of machinery  
which require from  
to 50 H.P. Address,  
Evans Friction Cone Co.,  
85 Water Street,  
Boston, Mass.

THE **CRESCENT** TRY IT!  
AND YOU WILL USE NO OTHER  
**THE CRESCENT BRAND  
PHOSPHOR  
TIN.**  
THE HIGHEST AND  
RICHEST GRADE MADE.  
MANUFACTURED ONLY BY:  
**THE CRESCENT PHOSPHORIZED METAL CO.**  
OFFICE AND WORKS  
2107 2109 and 2111 INDIANA AV. PHILADELPHIA, PA.

**PHOSPHOR-TIN**

BY USING MY PHOSPHOR TIN MANUFACTURERS CAN MAKE ANY DESIRED GRADE OF PHOSPHOR BRONZE THEMSELVES. BY THE SIMPLE PROCESS OF MELTING, MUCH CHEAPER THAN THEY ARE NOW TO BE HAD IN THE MARKET. NEW OR OLD COPPER CAN BE USED. FOR CIRCULARS AND PRICES ADDRESS **HALK & NAUMANN** NEW-YORK  
SOLE AGENTS FOR THE U.S. AND CANADA, 58 PEARL ST.

**The American Metal Co.**

(LIMITED),

Levin Building, 80 Wall St., New York.

P. O. BOX 957.

COPPER, COPPER ORES AND MATTES.  
TIN, LEAD, SPELTER, ANTIMONY, NICKEL,  
ALUMINUM, BULLION, IRON.

**Advances made on Consignments**

AGENTS FOR

Henry R. Merton & Co., - - London.  
Metallgesellschaft, Frankfurt-on-Main.  
Williams, Foster & Co., Ltd., Swansea.

**WASHBURN & MOEN MANUFACTURING CO.,**

WORKS IN WORCESTER, MASS., and WAUKEGAN, ILL.

MAKERS OF IRON, STEEL AND COPPER

EVERY VARIETY OF **W I R E** FOR ALL PURPOSES.

FINE OIL TEMPERED SPRINGS A SPECIALTY.

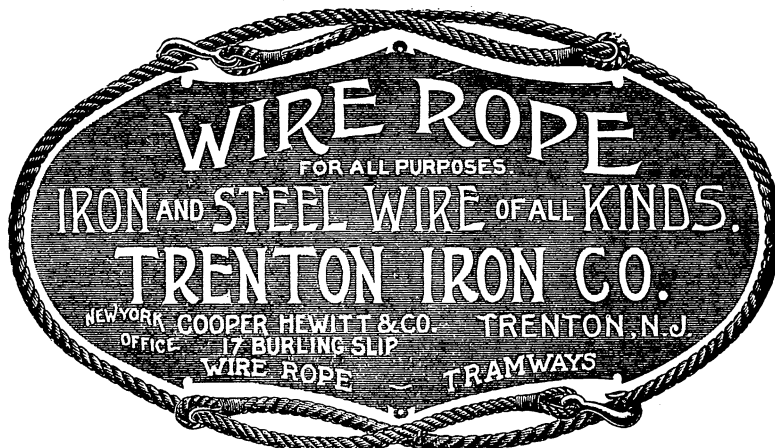
**SPIRAL**FURNITURE,  
BED AND  
SPECIAL  
SPRINGS.**FLAT**CLOCK  
and  
WATCH  
SPRINGS.

EXPORT ORDERS PROMPTLY FILLED.

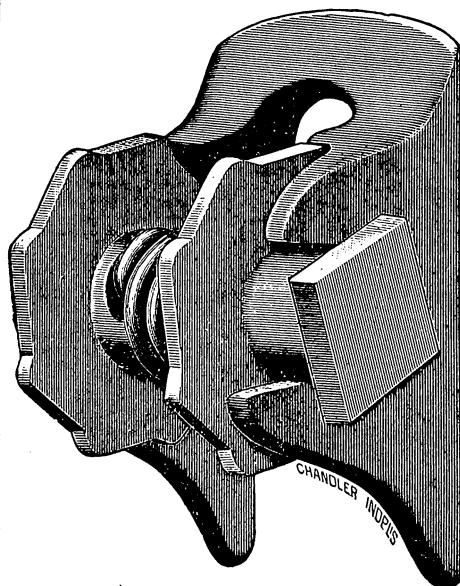
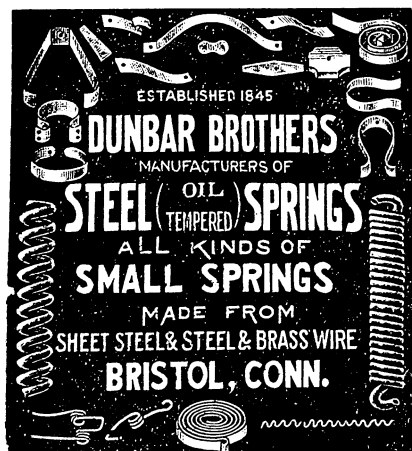
Warehouses: 16 Cliff and 241 Pearl Sts., New York; 107 &amp; 109 Lake St., Chicago; 8 &amp; 10 Pine St., San Francisco.



WM. MCFARLAND,  
IRON FOUNDER,  
TRENTON, - - N. J.  
**Chilled Cast Wire DIES**  
A SPECIALTY.  
Any Size or Style Made at Short Notice.



**J. F. KAY,**  
PASSAIC, N. J.  
MACHINERY FOR MAKING OF  
WIRE STRAND AND ROPE.  
Winding, Stranding and Closing Machines, &c. Electric Wire and Cable Machinery. Hemp Rope and Cordage Machinery.  
Plans and Estimates.

**LOYAL  
LOCK  
Ratchets.**

Patented March 24, 1891.

A Perfect Wire Tightener.

A Simple Tension Adjuster.

Holds any wire and will not loosen.

Saves Posts and Time in Fence Building. 1,000,000 in use. Is Unexcelled. In kegs of 100. Large Profits.

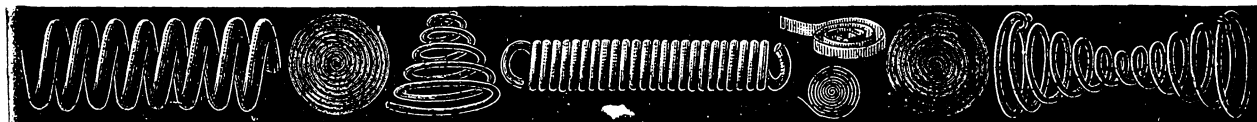
**WIRE FENCE SUPPLY CO.,**

329 MASS. AVE., - INDIANAPOLIS, IND.



117th to 118th Street and Harlem River.

General Offices, Foot 118th Street, New York.



Makers of Iron, Bessemer, Siemens-Martin and Crucible Cast Steel Wire of all kinds, annealed, soft and hard drawn; Coppered Spring Wire for Furniture Springs, &c., Coppered Soft Wires, Baling Wires, Suspension Bridge and Rope Wires of all kinds, &c.

## STEEL MUSIC WIRES and MUSIC SPRING WIRES,

UNRIVALED FOR PIANOFORTE STRINGS.

FOR THE HIGHEST CLASS OF SPRINGS.

Specialty of finest Cast Steel Wires, round, flat, square and any other shape, tempered and also in the soft state, guaranteed to harden and temper. Solid Rib and Paragon Umbrella Wires. Crinoline, Corset, Shade Roller, Lock, Hat, Brush, Saw, Band Saw, Clock Spring, Clock Bell, Clock Verge and Watch Spring, Rule and Tape Line and Eyeglass Wires, &c. Piano, Needle, Fish Hook, Drill and Hair Spring Wires. Special Cast Steel Wires of any kind made for special purposes. Also Covered Wires—Braided and Cloth and Paper Covered—for crinoline, corset and other purposes. Cold Rolled and Slit soft and Tempered Steel Strips of all kinds and for all purposes.

Special Wires and Springs of Every Description.

CORRESPONDENCE SOLICITED.

SAMPLES FURNISHED ON APPLICATION.

## SUPERIOR STEEL COMPANY, PITTSBURG, PA.

—MANUFACTURERS OF—

HOT  
and

## COLD ROLLED STEEL,

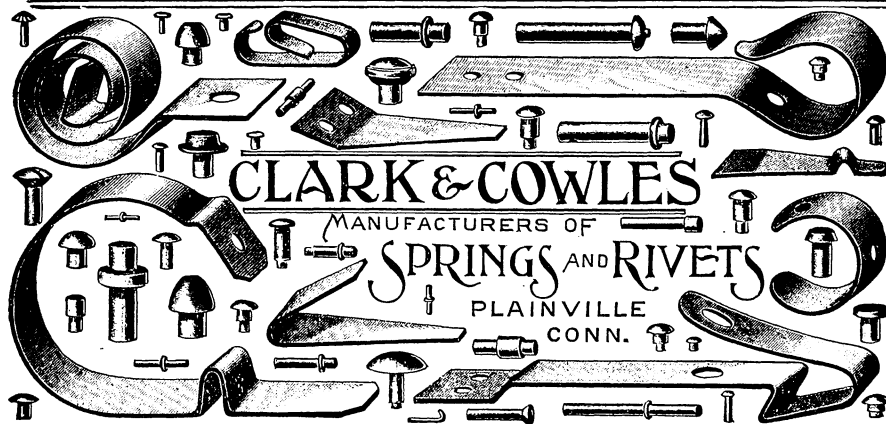
IN WIDTHS UP TO 10 INCHES, AND IN EXACT THICKNESSES FROM .0025 INCH TO 1/4 INCH IN BESSEMER, OPEN HEARTH, SWEDISH, AND IN NICKEL AND CRUCIBLE CAST STEEL OF ALL DESCRIPTIONS, FOR SEWING MACHINE, BICYCLE AND TYPEWRITER PARTS, KEYS, CHAINS, CUPS, BELLS, KNOBS, FERRULES, AND HIGHEST GRADES OF SPRING STEEL FOR PENS, CLOCK SPRINGS AND WATCH MAINSPRINGS.

—AGENCIES:—

ELY & WILLIAMS,  
No. 38 Park Row, New York.

No. 1239 Market St., Philadelphia.

SAMUEL T. ROWLEY,  
No. 1030 Monadnock Building, Chicago.



VOLUTE,  
WIRE  
and  
FLAT STEEL.

## SPRINGS

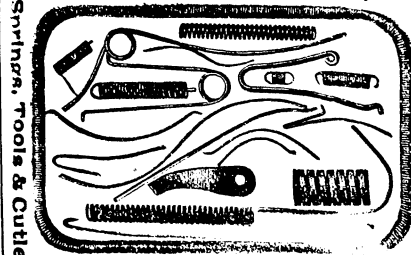
FOR Agricultural Implements, Machinery and various other purposes. Write for prices to  
**SABIN MACHINE CO.**  
MANUFACTURERS.  
MONTPELIER, VT.

## THE WIRE GOODS COMPANY,

Worcester, Mass.

Hardware and Kitchen Wire Goods. Specialties to order. Everything in Wire.

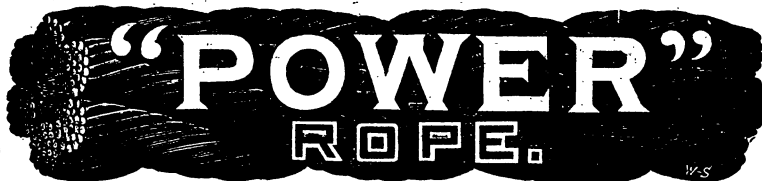
TUCK M'F'G CO., Brockton, Mass



Tempered Springs of all kinds.

Send for Catalogue.

Always  
Ask  
For



Unequaled for Strength  
and Durability.

Made Only by

Broderick & Bascom Rope Co.,  
St. Louis, Mo.

## HOWSON AND HOWSON

Counsellors at Law  
Solicitors of Patents

**PHILADELPHIA**  
Forrest Building, 119 S. 4th St.  
**NEW YORK**  
Potter Building, 38 Park Row.  
**WASHINGTON**  
Atlantic Building, 928 F St.

## PATENTS

U. S. and Foreign Secured.

Trade Marks and Copy Rights. Twenty Years' Experience. Send model or sketch and brief description of your invention for Free report as to patentability. Expert searches and opinions as to Scope, Validity and Infringement Patent Causes Prosecuted and Defended. Practice in U. S. Supreme, Circuit and Circuit Appeals Courts, and U. S. Patent Office.

Send for "Plain Words about Patents." Free.

**PATENT PRACTICE EXCLUSIVELY.**  
References Furnished on Application.  
**E. B. STOCKING, Attorney at Law,**  
611 F ST., N. W., WASHINGTON, D. C.

## CHARLES N. BUTLER, C.E..

ATTORNEY IN PATENT CASES

611 Mutual Life Building,  
Tenth and Chestnut Sts., PHILADELPHIA, PA.

Formerly of the Examining Corps,  
U. S. Patent Office.

## PATENTS.

H. W. T. JENNER, Patent Attorney and Mechanical Expert, 608 F. St., Washington, D. C. Charges moderate. Write for terms. Established 1883.

## W. S. ESTEY,

No. 65 FULTON ST., NEW YORK,  
MANUFACTURER OF

## WIRE CLOTH

Of Brass, Copper, Iron, Galvanized and Steel Wire of all meshes and grades. For Mining, Milling and all other purposes. Locomotive Spark Wire Cloth, &c.,

—AND—

## WIRE WORK

For Bank, Office and Counter Railing, Store Fronts, Window Guards, &c.

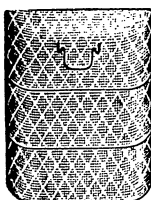
Galvanized Twist Netting.

Oliver's Patent Decoy Rat Traps.

ST Pat. Adjustable Foundry Riddles.

S T SAND SCREENS.

SEND FOR CATALOGUE.



WE are the largest mfrs. of lined  
**SPARK  
GUARDS**

In the U. S. Write for prices.

**Dow Wire Works Co.,**  
Louisville, Ky.

## A. LESCHEN & SONS' ROPE CO.,

MANUFACTURERS OF

Trade-Mark.



Registered.

ST. LOUIS, MO.

All genuine Hercules Wire Rope is made with a red strand.



WAREROOMS: 87 Liberty St., New York. WORKS: Wilkesbarre, Pa.

## NEW HAVEN WIRE MFG. CO.,

Manufacturers of **WIRE** in great variety

NEW HAVEN,

CONN.

Stable  
Fixtures,  
Fire  
Escapes,  
Window  
Guards,  
Weather  
Vaness.

Send for  
Catalogue.

Detroit, Mich.

Write for  
Prices.

Jail

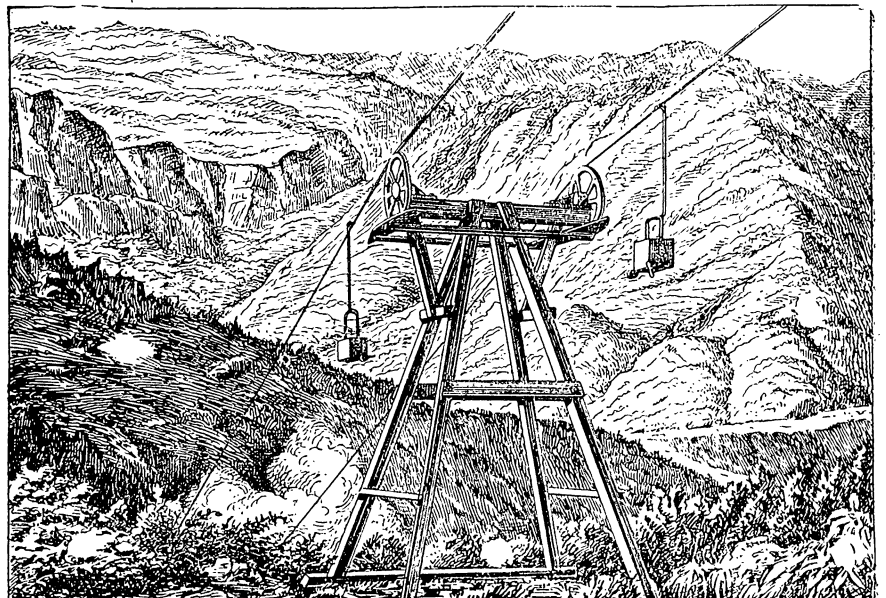
Cells,  
Bank and Office  
Railing,  
Iron Stairs  
and Columns.

Mention this  
paper.



## CALIFORNIA WIRE WORKS

509-511 MARKET STREET, SAN FRANCISCO, CAL.




Manufacturers of Wire Rope for Cable Railways and Mining Purposes.

## HALLIDIE'S PATENT WIRE ROPEWAY

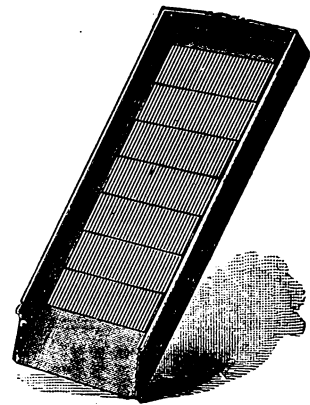
Simplest and most economical means of transportation. Send for Illustrated Catalogue.

**HOWARD & MORSE**  
**45 FULTON ST.**  
**NEW YORK.**  
**HEAVY MINING**  
**COPPER,**  
**BRASS,**  
**STEEL**  
**OR IRON**  
**WIRE CLOTH.**

ALSO  
 MANUFACTURERS OF  
**GENERAL**  
**WIRE WORK.**  
 Window Guards,  
 Stable Fixtures,  
 RAILINGS,  
 Sand Screens  
 Coal Screens  
 Etc.

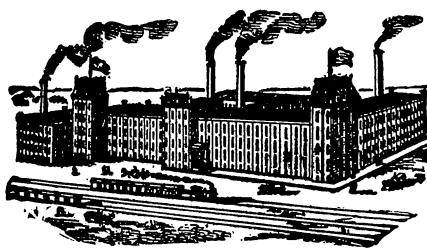


**FLANGE STEEL SCREENS**  
 OF PERFORATED METAL  
 For SAND, GRAVEL, COAL, and ORE.



**THE HENDRICK MFG. CO., LTD.,**  
 CARBONDALE, PA.

**WICKWIRE BROTHERS,** CORTLAND, N. Y.  
 MANUFACTURERS OF  
 Wire Cloth and Wire Goods,



Coal Sieves,  
 Flour Sieves,  
 Corn Poppers,  
 Dish Covers,  
 Metallic  
 Coal Sieves.

**NEW PROCESS**  
**Cortland**  
**POWER LOOM**  
**WIRE CLOTH.**

Every roll wrapped in Pink  
 Paper and has our name on  
 label.

Quick Shipment. Write for Prices.

BARBED  
 PLAIN  
 CABLE

**WIRE**

NAILS  
 STAPLES  
 STRETCHERS

**INDIANA WIRE FENCE CO.,**  
 Crawfordsville, Ind.

**Kilmer Manufacturing Co.**

—Newburgh, N. Y.

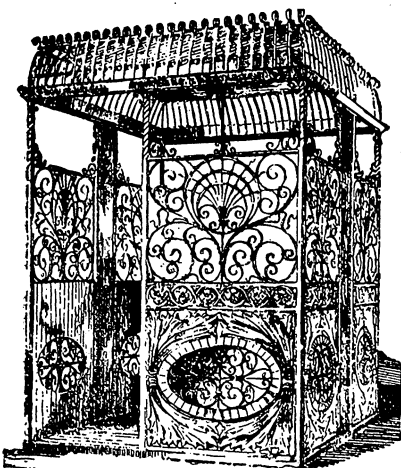
Manufacturers of

**BALE TIES**

For Baling  
 Hay, Straw,  
 Rags,  
 Excelsior, &c.

ALSO WIRE RODS, BARB WIRE, COILED STEEL WIRE, WIRE STAPLES, GALVANIZED WIRE, ORNAMENTAL FENCING, &c., &c.

Western Warehouse, 543 and 545 State Street, Chicago, Ill.  
 Western Office, 21 Quincy Street, Chicago, Ill.  
 New York Office, 111 Water Street, New York City.  
 Works and General Office, Newburgh, N. Y.



**Elevator Enclosures.**

Brass Wire and Iron Railings in plain or fancy designs.

Wire and Wrought Iron Fences and Window Guards.

WRITE FOR CATALOGUE.

**LUDLOW-SAYLOR WIRE CO.,**

114 & 116 South 4th St., St. Louis, Mo.

**THE VAN DORN IRON WORKS CO., Cleveland, Ohio.**



Office and Salesroom, 157 1/2 Euclid Ave.,  
 MANUFACTURERS OF  
**WROUGHT IRON FENCE and RAILING.**  
 Stable Fixtures, Crestings, Terminals, Wire Office and  
 Counter Railing, Lawn Seats and Vases.  
 Iron and Steel Jail Cell Work. Ornamental and Structural Ironwork.

**CHAMPION**  
**IRON CO.**

**SPECIALTIES.**—Iron Stairs and Jail Work, Builders' and Ornamental Iron Work, and the only manufacturers of Malleable Iron Cresting guaranteed against breakage; also manufacturers of the Celebrated Ohio Champion Iron Force and Lift Pumps. Send for 220-page Catalogue.

Largest Iron Fence and Railing Works in U. S.

**KENTON, O.**

**GEO. W. PRENTISS & CO.,**  
 HOLYOKE, MASS.,

—MANUFACTURERS OF—

**WIRE.**



Bright, Coppered, Annealed and Tin Plated.  
 Finished to order, round, square, oval or flat.

**TINNED WIRE OF ALL SIZES A SPECIALTY**

**COBB & DREW,**  
 PLYMOUTH, MASS.

Manufacturers of Norway Iron Rivets, Brass and Copper Rivets, Burrs, Washers, D. P. Tacks and Staples.

New York Agency, James S. Henderson, successor to Disosway & Henderson, Hardware.

Agents for Philadelphia Star Carriage and Tire Bolts.



# CLINTON WIRE CLOTH CO.,

— Manufacturers of Every Description of —

WIRE CLOTH, HEX. NETTINGS, WIRE LATH AND FENCING.

**Perforated Metals.** GALVANIZERS AND TINNERS OF **Wire Cloth and Nettings.**

Clinton "Standard" (Number 33 Wire) Painted Window Screen Wire Cloth.

FACTORY AND GENERAL OFFICE: CLINTON, MASS.

NEW YORK, 76 Beekman Street.

BOSTON, 199 Washington Street.

CHICAGO, 137 Lake Street.

## The Gilbert & Bennett Mfg. Co.

— MANUFACTURE —

Pearl Window Screen Wire Cloth.  
Galvanized Steel Wire Cloth.  
Galvanized Wire Poultry Netting.  
"Cottage" Lawn & Garden Fencing.  
"C. & B." Web Wire Fencing.  
Sieves, Riddles, Screens.  
Gilbert's Rival Ash Sifters.  
House Furnishing Wire Goods.

**WIRE CLOTH, NETTING,**  
Fencing, Gates, Fencing Tools,  
**Wire Goods, Wire Work**

Stable Fixtures, Railings, Window Guards.  
WIRE LATHING WITH HAMMOND'S METAL FURRING.

44 Cliff Street,  
**NEW YORK.**

148 Lake Street,  
**CHICAGO.**

Factories, { GEORGETOWN, CONN.  
CHICAGO, ILLINOIS.  
ESTABLISHED 1818.

## WRIGHT & COLTON WIRE CLOTH CO., Worcester, Mass.

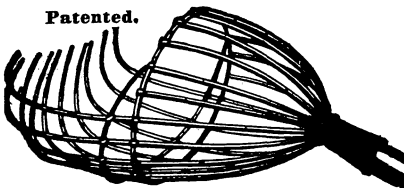


NEW PROCESS  
**HARD STEEL WIRE CLOTH AND NETTING**  
GALVANIZED  
**WIRE NETTING.** Painted Window Screen Wire Cloth,  
WIRE LATHING, HOUSE FURNISHING WIRE GOODS.

Patented March, 1884.  
Patents Pending.

SEND FOR LATEST CATALOGUE.

## "PENNSYLVANIA" FRUIT PICKER.



This Cut almost speaks for itself—the device being so much like the human hand shows at once the utility of the article.

**AS A FRUIT PICKER IT HAS NO SUPERIOR.**

It is made of Heavy Galvanized Wire, and Easily Adjusted to a Pole. It has been sold for several years, and the demand (as it is becoming known) is steadily increasing. The difficulty of detaching fruit and securing it unbruised is apparent to everyone so engaged. This overcomes the difficulty, and saves the finest fruit, which commands the highest prices.

**THE LOW PRICE AT WHICH IT IS SOLD.**

brings it within the reach of those who have but little fruit to gather as well as those who have large quantities.

Price, per dozen, \$6.00. Liberal discount to dealers. It will gather Apples, Peaches, Pears, etc.

Manufactured by **Pennsylvania Wire Works,**  
**EDWARD DARBY & SONS,** 233 & 235 Arch St., Philadelphia, Pa.

PAINTED AND GALVANIZED WINDOW SCREEN CLOTH.

IRON, STEEL, BRASS AND COPPER WIRE CLOTH.

MANUFACTURERS  
**THE ROEBLING**  
**STANDARD**  
**WIRE**  
**LATHING.**

**NEW JERSEY**  
**WIRE CLOTH CO.**

**"JERSEY"**  
**POULTRY**  
**NETTING**  
**AND FARM**  
**FENCING.**

FRENTON, 117 and 119 LIBERTY STREET,  
NEW JERSEY.

NEW YORK.

171 and 173 LAKE STREET,  
CHICAGO.

25 and 27 FREMONT STREET,  
SAN FRANCISCO.

A large per cent. of the Nail Mills, Horse Shoe Concerns and Bolt and Nut Works are using our

Patent 2 Stave

**KEGS**

Furnished in knock-down or ready for use.  
**Crescent Manufacturing Company.**  
DETROIT MICH.

Perforated Filter  
Press Plates.



BRONZE SCREEN PLATES  
To withstand action of  
AGULATED WATERS.

## PERFORATORS OF STEEL, IRON, COPPER, ZINC, BRASS AND TIN.

GRAIN CLEANING AND MINING MACHINERY,  
WOOLEN, COTTON, PAPER AND PULP MILLS,  
RICE, FLOUR AND COTTON SEED OIL MILLS,  
SUGAR AND MALT HOUSES,  
DISTILLERIES, FILTER PRESSES,

FOR USE IN

STONE, COAL AND ORE SCREENS,  
BRICK AND TILE WORKS, FILTERS,  
SPARK ARRESTERS, GAS AND WATER WORKS,  
OIL, GAS AND VAPOR STOVES,  
COFFEE MACHINERY, ETC., ETC.

STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.

Main Office and Works, 222 to 240 N. Union St., Chicago, Ill., U. S. A. Eastern Office, No. 284 Pearl St., New York.



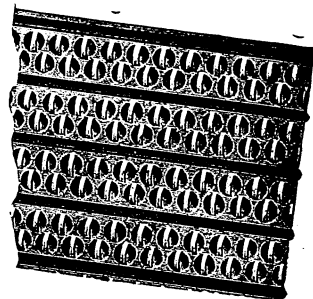
# S.S.S.R.

(Standing Seam Steel Roofing)

AND

## COLUMBIA STEEL LATH.

Two of our specialties that commend themselves to all interested in the proper construction of buildings. Made of superior quality steel, readily applied, and both cheap in price. Write for our little book, "The Life of an Iron Roof; or, How Long Will It Last?"



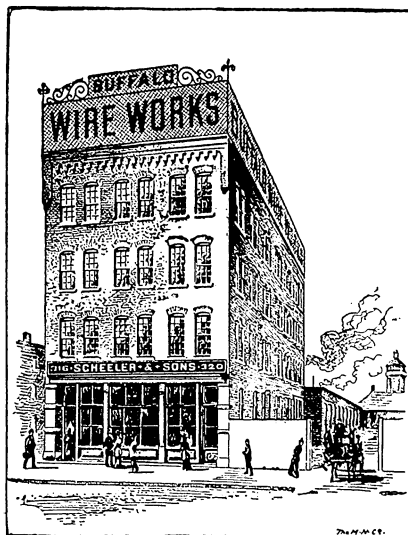
The Cincinnati Corrugating Co., - Box 312, Piqua, Ohio.

## The New York Iron Roofing and Corrugating Co.

Finest and Largest Variety of  
Sheet Metals. Products manufactured in the U.S.

FIRST & WASHINGTON STS.

JERSEY CITY, N.J.



## SCHEELER & SONS,

MANUFACTURERS OF

## Wire Cloth and Wire Goods,

ARTISTIC

METAL WORK, ETC.

316, 318, 320 Terrace, near Genesee,

61, 63, 65 Jackson Street,

Buffalo, N. Y.

## The Practical Brass and Iron Founder's Guide.

A Treatise on Brass Founding, Molding,  
the Metals and their Alloys, etc.

By JAMES LARKIN.

Late Conductor of the Brass Foundry Department of  
the Penn Works, Philadelphia.

A New Revised and Greatly Enlarged Edition.

### CONTENTS:

Among the most important and entirely new sections  
of this edition of this valuable and popular  
book are the following:

Behavior of Metals and Alloys in Melting and Congealing; Malleable Iron Castings; Wrought Iron or Mitis Castings; Manufacture of Steel Castings; Casting of Brass; Casting of Bronze; Bell Founding; Chill Casting; Casting without Core; Casting on to other Metals; Casting Iron and other Metals upon Lace, Embroideries, Fern Leaves and other Combustible Materials; Some Modern Bronzes.

In one volume, 12mo, 400 pages, \$2.50.

Sent, postpaid, on receipt of price, by

DAVID WILLIAMS,

Bookseller and Publisher,

96 - 102 Reade Street, - New York.

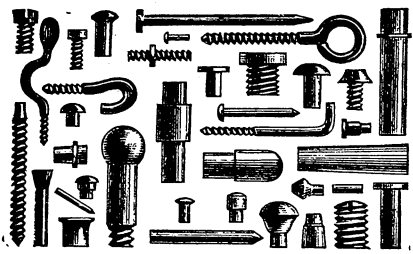
CRIMPED  
STEEL  
WIRE

## LAWN FENCES

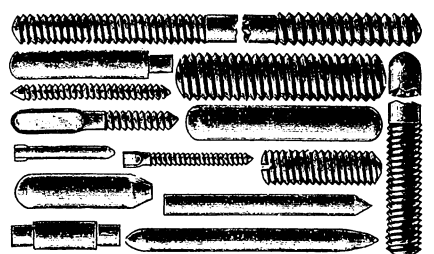
TREE GUARDS and SETTEES, CHEAPER THAN WOOD.

McCALLIP FENCE AND WIRE WORKS, Columbus, Ohio.



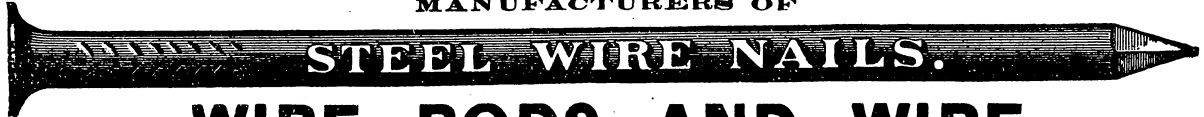


**IRON and BRASS RIVETS,**  
**STUDS, PINS, SCREWS, &c,**  
 For Manufacturers of Light Hardware.  
**Blake & Johnson**  
 WATERBURY, CONN.



# NEW CASTLE WIRE NAIL CO.,

MANUFACTURERS OF



**WIRE RODS AND WIRE.**

Office and Works,

**NEW CASTLE, PA.**

## THE BOND NAIL.



These nails are made from different sizes of wire with head at any desired position between the points. For coopers, box and furniture manufacturers' dowels, they are unsurpassed. Builders and repairers of all kinds will find these nails useful. We also manufacture Doweling Machines and Sets for driving these nails. Address

**THE BOND NAIL CO.,**

P. O. Box 23,

**RAYNHAM, MASS.**



FRANKLIN S. MILES,

Manufacturer of

Brass, Iron, Steel and German Silver

**SCREWS,**

205 Quarry St., Philadelphia.



## THE SALEM WIRE NAIL CO.

— MANUFACTURERS OF —

**STEEL WIRE NAILS, FENCE STAPLES,**  
**ANNEALED and GALVANIZED WIRE.**

Works: SALEM, O.; FINDLAY, O.

General Office: SALEM, OHIO.

BRANCH OFFICES:

Room 32, 277 Broadway, New York.

415 Phenix Bldg., Chicago.

200 Amer. Central Bld'g, St. Louis.

19-20 Ainsworth Block, Portland, Ore.

38 Pickering Bld'g, Cincinnati, O.

Osgood & Howell, 132 Market St., San Francisco, Cal.



## ONE GROSS BOX,

Containing a full assortment of **CARPET TACKS**, made in polished, blue and tinned.

PUT UP IN SALABLE FORM.



A Complete Line.

No Dead Stock.

No Large Investment.

SEND FOR PRICE.

**Duplicating Samples a Specialty.**

**BORDEN & LOVELL,**

70 AND 71 WEST STREET,  
 NEW YORK.

Steel, Iron and Wire Nails.

IMPROVED

**Tack and Shoe Nail**

MACHINERY.

**KIMBAL BROS. & CO, Mfgs,**  
 BROCKTON, MASS.

Send for Prices.

Established 1882.

Capacity 100,000 Tons.

## THE AMERICAN WIRE CO.,

CLEVELAND, OHIO,

MANUFACTURERS OF **WIRE RODS, AND DRAWERS OF**  
**IRON AND STEEL WIRE**

OF EVERY DESCRIPTION.

SCREW, RIVET, BOLT AND TELEGRAPH WIRE,  
 TELEPHONE AND SCREEN WIRE,

GALVANIZED, TINNED AND COPPERED WIRE,

**W**IRE Straightened  
 and Cut to  
 Lengths.

HIGH GRADE AND FINE QUALITY WIRES A SPECIALTY.

Address **AMERICAN WIRE CO.,**  
 CLEVELAND, O.

# American Screw Company,

PROVIDENCE, R. I.



## MANUFACTURERS OF

### WOOD SCREWS,

In Iron, Brass, Bronze and all Varieties  
of Finish.

### COACH SCREWS,

### MACHINE SCREWS,

### RAILROAD SCREWS,

### HAND RAIL SCREWS,

### SIDE KNOB SCREWS,

### LOCK CAP SCREWS,

### DOWEL SCREWS,

### CHANDELIER SCREWS,

### RIVETS, BURS,

### TIRE BOLTS,

### STOVE BOLTS,

### SLEIGH SHOE BOLTS,

### SINK BOLTS,

### STOVE RODS,

### POINTED WIRES,

### TAPPED NUTS,

### WIRE NAILS,

### DOWEL PINS,

### TAPS FOR MACHINE SCREWS,

### TAPS FOR STOVE BOLTS.

**COLD  
FORGED**

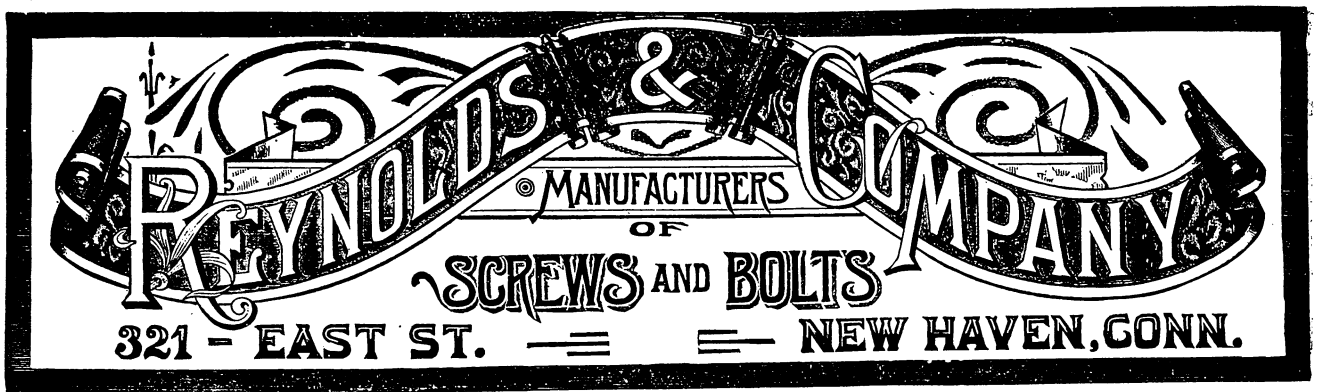
Rogers Drive Screws,  
Side Knob Screws,  
Lock Cap Screws,  
Machine Screws,  
Stove Bolts,  
Forged Wood Screws,  
Threaded Wires,  
Fluted Tire Bolts.

# American Screw Company,

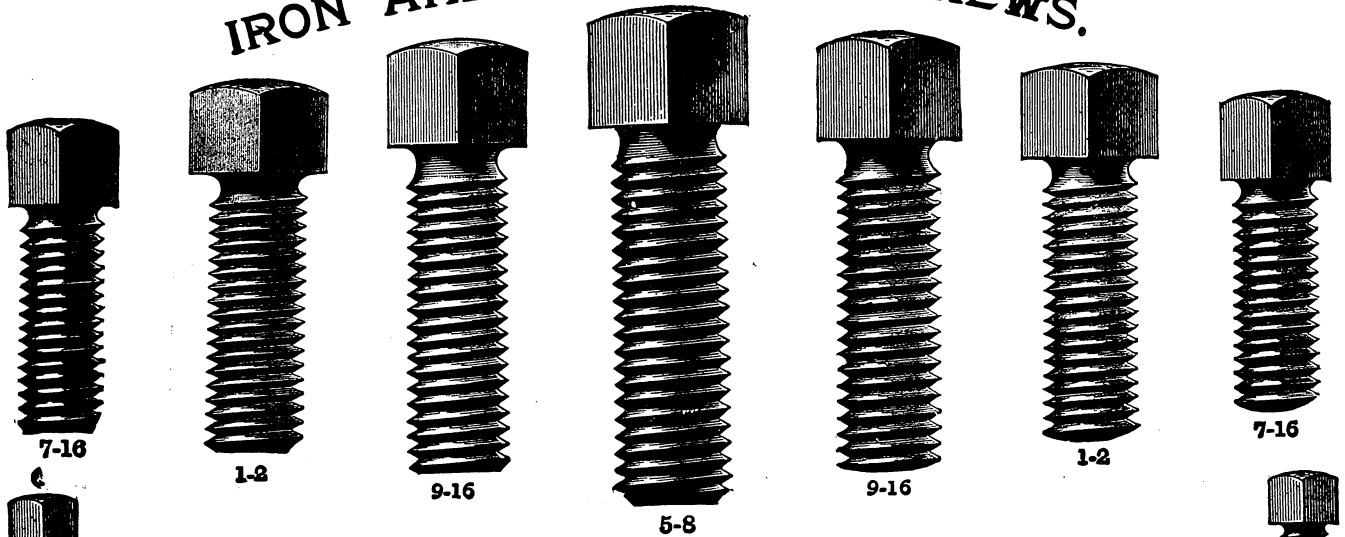
PROVIDENCE, R. I.

Chicago Store, No. 19 Lake St.

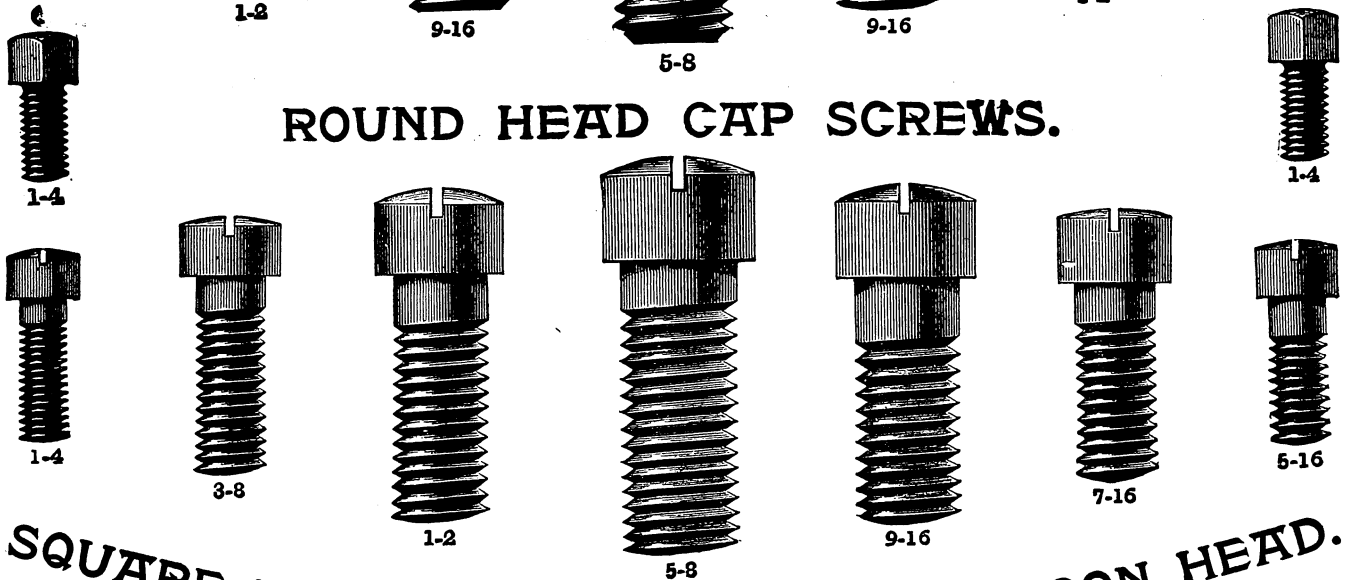
EUROPEAN AGENTS, THOMAS & STIRLING, Liverpool.



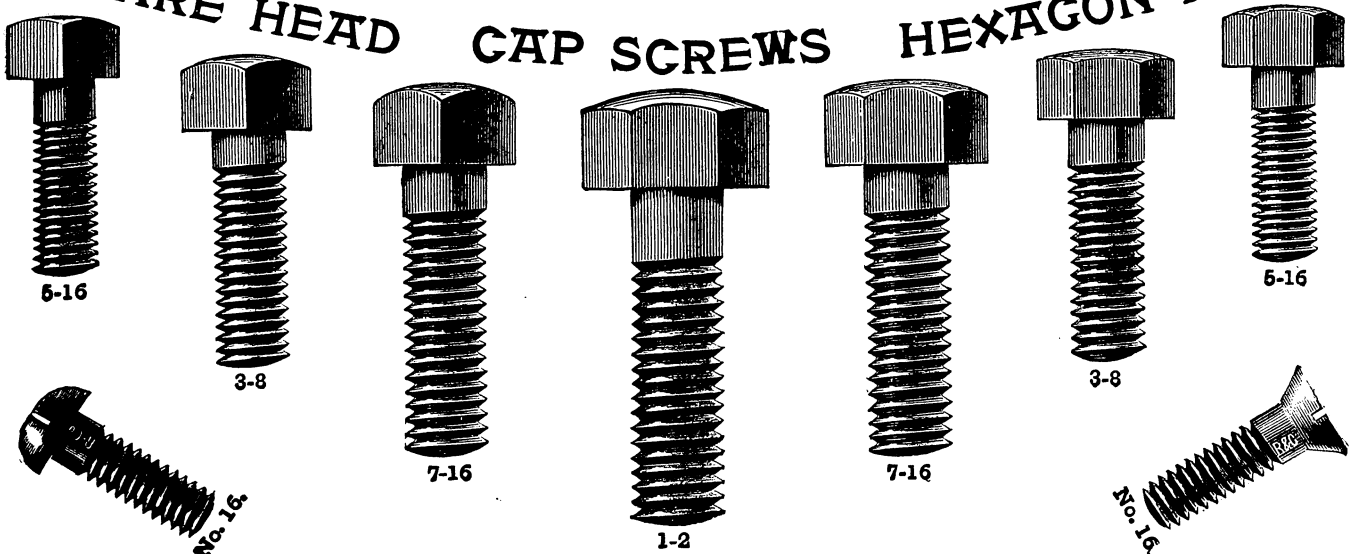
## IRON AND STEEL SET SCREWS.



## ROUND HEAD CAP SCREWS.



## SQUARE HEAD CAP SCREWS HEXAGON HEAD.



SEND FOR CATALOGUE.

**ATLAS TACK CORPORATION.****508 SEARS BUILDING, BOSTON, MASS., U. S. A.**

BRANCHES: { **DUNBAR, HOBART & CO., WHITMAN, MASS.** ESTABLISHED IN 1810. **CONSOLIDATED 1891.** **LORING & PARKS, PLYMOUTH, MASS.** ESTABLISHED IN 1842.  
**A. FIELD & SONS, TAUNTON, MASS.** ESTABLISHED IN 1827. **TAUNTON TACK CO., TAUNTON, MASS.** ESTABLISHED IN 1864.  
**AMERICAN TACK CO., FAIRHAVEN, MASS.** ESTABLISHED IN 1867. **OLD COLONY RIVET CO., PLYMOUTH, MASS.** ESTABLISHED IN 1868.

**MANUFACTURERS OF**

Tacks, Brads, Small Nails, Shoe Nails, Lining and Saddle Nails, Tufting Nails and Buttons, Wire Nails, Finishing Nails, Patent Brads, Hungarian Nails, Steel Shanks for Boots and Shoes, Wire Tacks, Escutcheon Pins, Eyelets, Glaziers' Points, Rivets, Burrs, Furniture Springs, Pilgrim Spring Bed, and other articles.

We have the largest and only complete and fully assorted stock in the world. Our manufacturing facilities are unequalled. The foregoing well-known brands we continue to use, and either will be furnished upon request. We have long distance telephone connection with our New York Store and our factories.

**MAIN OFFICE, 508 SEARS BUILDING, 199 WASHINGTON ST., BOSTON, MASS.****BRANCH OFFICE & WAREHOUSE, 31 WARREN ST., NEW YORK.****BRANCH OFFICE & WAREHOUSE, 193 LAKE ST., CHICAGO, ILL.****BRANCH OFFICE & WAREHOUSE, 408 MARKET ST., SAN FRANCISCO, CAL.****BRANCH OFFICE & WAREHOUSE, 339 MARKET ST., PHILADELPHIA, PA.****BRANCH OFFICE & WAREHOUSE, 14 WEST GERMAN ST., BALTIMORE, MD.****GRAND CROSSING TACK CO.,****GRAND CROSSING, CHICAGO, ILL., U. S. A.**

Tacks and Small Nails, Wire Nails and Brads, Double Pointed Tacks and Staples, Lining and Saddle Nails, Slating and Roofing Nails, Brass and Iron Shoe Nails and Special ties.

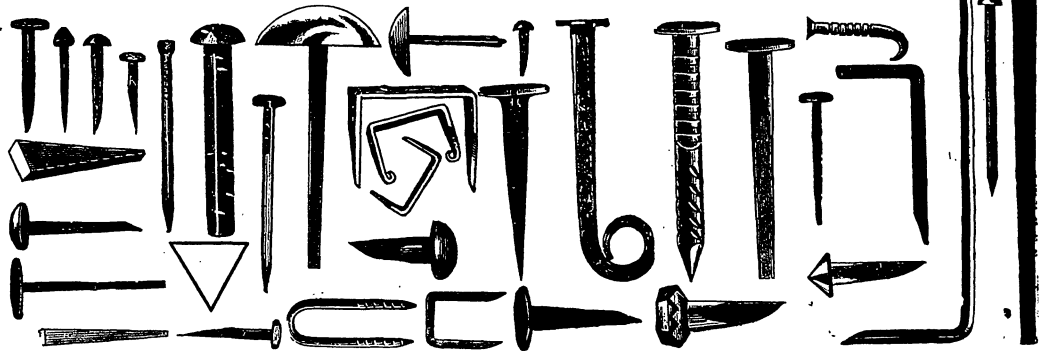
**NOVELTY 5c. SELLERS.****CHAMPION WOOD KEYS.**

**TACKS.** CLAW HANDLES.  
 FT. DEARBORN.  
 (3/16 in. dia.)  
 BONNIE BLUE.

**NAILS.** PARISIAN GILT.  
 JUST ENOUGH.  
 (Brass.)  
 DOUBLE ENOUGH.  
 (Iron.)

**BRADS. BILL NYE BOX.**

New York Office,  
 84 WEST BROADWAY.

**We Give****Better Value**

. . . IN . . .

**Brass Shoe Nails,**

As we carefully sift and assort them, so that all the dust and imperfect nails are removed.

Prices no Higher. Prompt Shipments.

**CLENDENIN BROS., Baltimore, Md.**

THE CELEBRATED

**"SILVER FINISH"****GALVANIZED POULTRY NETTINGS.**

FOR SALE BY THE HARDWARE TRADE.

GET THE BEST

**PHILLIPS, TOWNSEND & CO.,**  
 North Penn Junction, Philadelphia.

**WIRE NAILS, - - -**  
**- - - NORWAY RIVETS.**

Rivets marked "P" are not of our make. We make only first-class NORWAY IRON RIVETS.

Corrugated, Crimped and Clap-Board Iron Roofing &amp; Siding



Iron Buildings, Roofs, Doors, Shutters, Cornices,  
 Skylights, Bridges, &c.

**MOSELEY IRON BRIDGE AND ROOF CO.,**  
 Office 5 Dey Street, Room 13, NEW YORK.

**E. H. Titchener & Co.,**  
 BINGHAMTON, N. Y.

—MANUFACTURERS OF—

**STAPLES in All Varieties.**

Double-Pointed Tacks, Bed Links, Etc.

New York City Agents, **HARMON & DIXON,**  
 118 Chambers Street.

## Standard Books

—ON—

**FOUNDRY PRACTICE.****The Iron Founder.**

A comprehensive treatise on the art of molding, including chapters on core-making, loam, dry sand and green sand molding, also crystallization, shrinkage and contraction of cast iron and a full explanation of the science of pressures in molds, added to which are formulas for mixtures of iron, tables, rules and miscellaneous information. By SIMPSON BOLLAND. Illustrated with over 300 engravings. 12mo, cloth.... \$2.50

**The Iron Founder Supplement.**

A complete illustrated exposition of the art of casting in iron, comprising the erection and management of cupolas, reverberatory furnaces, blowers, dams, ladles, etc., mixing cast iron, founding of chilled car wheels, malleable iron castings, foundry equipments and appliances, gear molding machines, molding machines, burning, chilling, softening, annealing, pouring and feeding, foundry materials, advanced molding, measurement of castings, wrought iron, steel, etc. Also the founding of statue, the art of taking casts, pattern modeling, useful formulas and tables. By SIMPSON BOLLAND. Illustrated with over 200 engravings; 400 pages; 12mo; cloth..... \$2.50

**The Encyclopedia of Foundry and Dictionary of Foundry Terms,**

used in the practice of molding. Together with a description of the tools, mechanical appliances, materials, and methods employed to produce castings in all the useful metals and their alloys including brass, bronze, steel, bell, iron and type founding, with many original mixtures of recognized value in the mechanic arts. Also aluminum, plating, gilding, silvering, dipping, lacquering, staining, bronzing, tinning, galvanizing, britannia ware, German silver, pickle, soldering, brazing, ores, smelting, refining, assaying, etc. By SIMPSON BOLLAND. 12mo; cloth..... \$3.00

**Modern Molding and Pattern Making.**

A practical treatise upon pattern shop and foundry work. By JOSEPH P. MULLIN, M.E.: 257 pages; cloth; illustrated. .... \$2.50

**Iron and Steel Founding**

Illustrated with 39 diagrams. By C. WYLIE. Second edition, revised and enlarged; 324 pages; 8vo; cloth..... \$2

**The Practical Brass and Iron Founder's Guide.**

A treatise on brass founding, molding, the metals and their alloys, etc. By JAMES LARKIN, late conductor of the brass foundry department in the Penn Works, Philadelphia. A new revised and greatly enlarged edition. Contents: Among the most important and entirely new sections of this edition of this valuable and popular book are the following: Behavior of Metals and Alloys in Melting and Congealing; Malleable Iron Castings; Wrought Iron or Mitis Castings; Manufacture of Steel Castings; Casting of Brass; Casting of Bronze; Bell Founding; Chill Casting; Casting without Core; Casting on to Other Metals; Casting Iron and Other Metals Upon Lace, Emacoideries, Fern Leaves and Other Combustible Materials; Some Modern Bronzes. In one volume; 12mo; 400 pages..... \$2.50

**American Foundry Practice.**

Treating of loam, dry sand and green sand molding, and containing a practical treatise upon the management of cupolas and the melting of iron. By THOMAS D. WEST, practical iron molder and foundry foreman. Fully illustrated. Eighth edition, revised. 408 pages; cloth..... \$2.50

**Molder's Text Book,**

being Part II of American Foundry Practice. A practical treatise on molding, discussing the question of economy in casting and the arrangement of a foundry in regard to rapid work. Treating of cupolas, methods of firing, best means of securing perfect and sound castings, &c., being a continuation of Vol. I on this subject, and dealing with a class of work requiring more skill and greater care. By THOMAS D. WEST. With numerous illustrations. Fifth edition. 461 pages; cloth..... \$2.50

Sent, Postpaid, on receipt of price, by

**DAVID WILLIAMS,**

Bookseller and Publisher,

96-102 Reade St., - New York.

**Gautier Steel Department of Cambria Iron Co.,**

JOHNSTOWN, PA.

—: MANUFACTURERS OF:—

**MERCHANT BAR STEEL:**

Including Tire, Toe Calk, Machinery, Carriage Spring, Railroad Spring, Hoe, Rake, Fork, etc.

**AGRICULTURAL STEEL AND SHAPES:**


Finger Bars, Knife Backs, Rake Teeth, Bundle Carrier Teeth, Tedder Forks and Springs, Spring Harrow Teeth, Harrow (Drag) Teeth, Seat Springs, etc.

**PLOW STEEL:**

Flat and Finished Plow Shapes, Digger Blades, Slabs, (Penn and Pernot), Hammered Lay, Rolled Lay, etc.

**COLD ROLLED STEEL SHAFITING.****STEEL HARROW DISCS.****CAMBRIA LINK BARB WIRE.**New York Office,  
102 Chambers St.Philadelphia Office,  
S. W. Cor. 5th & Commerce Sts.Chicago Office,  
209 Phenix Building.Southern Office,  
Chattanooga, Tenn.

**THE CAMBRIDGE IRON & STEEL CO.**  
MANUFACTURERS OF

**GALVANIZED**  **SHEET IRON**

BLACK SHEETS FOR ROOFING & CORRUGATING

PICKLED & COLD ROLLED FOR STAMPING

CAPACITY RANGES FROM NO 30  
26 INCHES WIDE TO 14' 40' 120

CORRESPONDENCE SOLICITED

OFFICE & WORKS CAMBRIDGE, OHIO.

**THE JERSEY CITY GALVANIZING CO., MANUFACTURERS AND JOBBERS IN Galvanized Material of Every Description.**

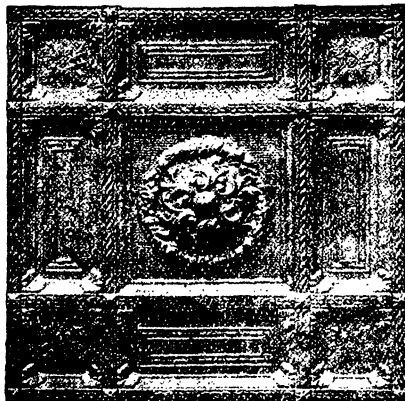
Plain, Painted or Galvanized Corrugated Sheets.

**SIDING, ROOFING, CEILING, &c., &c.**

Galvanized and Plain Steel and Iron Sheets, Bars, Hoop and Band Iron, Nails, Spelter, Lead, Tin, &amp;c.



Galvanized Riveted Leader, cheapest and best in the market. Sheet Iron Piping and Fittings of every description.

**GENERAL GALVANIZING TO ORDER.**65, 67 & 69 Bay St., and 68 70, 72, 74 & 76 Morgan St., Jersey City, N.J.  
Store and Office, 112 John St., opposite Cliff St., New York.**SECTIONAL PANEL STEEL CEILINGS.****ELEGANCE**

The Superior Merits of our Steel Ceilings and Side Wall Plates are

**DUST PROOF JOINTS.**

Mouldings varying in depth from 11-16 inch to 2 1/4 inches.

**VARIETY INDEFINITE.**

Sagendorph's Patent Sectional Steel Products Excel and Exceed all others combined. Ceilings and Side Walls Perfection Intact.

SOLE MANUFACTURERS,

**THE PENN IRON ROOFING & CORRUGATING CO.**  
(LIMITED),

PHILADELPHIA, PA.

# Lukens Iron <sup>AND</sup> Steel Co. INCORPORATED 1890.

The First to make Boiler Plates in America.

Chas. Huston, Prest. A. F. Huston, Vice-Prest. C. L. Huston, Genl. Mgr. Robt. B. Haines, Jr., Secy. Jos. Humpton Treas.

## STEEL AND IRON PLATES, ALSO SHEETS

TO EXTREME DIMENSIONS. WIDTHS UP TO 10 FEET. THICKNESS, No. 12 GAUGE TO 1 1/4 INCHES.

—ESTABLISHED 1810.—

MAIN OFFICE & WORKS:  
Coatesville, Pa.

NEW YORK OFFICE:  
No. 29 Broadway.

PHILADELPHIA OFFICE:  
62 & 64 Bullitt Bldg.

FRANK SAMUEL,  
138-138 So. 4th St.,  
Philadelphia.

## LOW PHOSPHORUS

PIC IRON—.08 or under.  
SCRAP—.08 or .05 or under.  
ORE—For O. H. and Furnace Use.  
MELTING BAR—  
Open Hearth and Bessemer Billets,  
Skelp, Muck Bars and Scrap, Foundry  
and Bessemer Pig Iron.  
Syracuse Tube Co.'s Tubes and Pipe.

## THE PHOENIX IRON CO., 410 Walnut St.- Philadelphia,

MANUFACTURE ALL THEIR PRODUCTS BOTH IN

### WROUGHT IRON AND OPEN HEARTH STEEL.

Beams, Channels, Deck Beams, Angles, Tee-bars, Zee-bars and other shapes, Round, Flat and Square BARS of all sizes, Especially adapted for Bridge and Ship Builders, Fire-proof Buildings, Shafting and all Structural Purposes.

SPECIALTIES, in Wrought Iron or Steel:—Phoenix Columns and Upset Eye-Bars of all sizes,  
Roof Trusses, Girders, Joists and Built-up Shapes of every description.

AGENTS:—EDWARD CORNING & Co., 29 Broadway, NEW YORK; EDWARD CORNING & Co., 70 Kilby St., BOSTON, MASS; JAMES B. STOKES, 182 Market St., SAN FRANCISCO. WESTERN OFFICE: A. C. STITES, 931 The Rookery, CHICAGO.

## POTTSVILLE IRON AND STEEL CO., POTTSVILLE, PA.,

PHILADELPHIA OFFICE, 226 SOUTH 4th STREET

MANUFACTURERS OF ALL KINDS OF

## STRUCTURAL IRON AND STEEL,

Viz., I Beams, Deck Beams, Channels, Tees, Angles, Plates and Bars; and also Open Hearth Steel Billets, Blooms and Slabs.

BREWERY, MALT AND ICE HOUSE CONSTRUCTION A SPECIALTY.

Designers and Constructors of Roofs, Trusses, Columns, &c.

## TESTED CHAINS.

## BRADLEE & CO., - EMPIRE CHAIN WORKS,

Beach and Otis Streets, PHILADELPHIA.

Chains for Foundry Cranes and Slings, "D. B. G." Special Crane Chain. Steel and Iron Dredging.

Slope and Mining Chains. Ship's Cables and Marine Railway Chains.

## High Grade Tested Chains.

JAMES MCKAY & CO.,

29TH & LIBERTY STREETS,

PITTSBURGH, PA.

Manufacturers of Coil, Crane and Stud Chain. We also manufacture High Grade Steel Chain made of Basic Steel and Special Crane Chain made of U. S. Iron.

BARCLAY W. COTTON & CO.,

Successors to ESHERICK, COTTON & CO.,

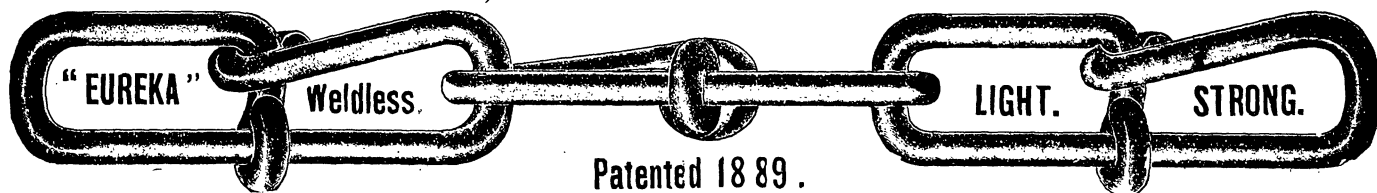
Iron and Steel Merchants.

AGENTS FOR

"Continental" Corrugated Furnaces.

418 Walnut St., PHILA.

NEATEST AND BEST, COMBINING LIGHTNESS WITH STRENGTH.



Made by automatic machinery, thus guaranteeing absolute uniformity. No welds, no weak links. Can be furnished in Coil Chain, or made up in Trace Chains, Tie Out Chains, Halters, &c. Also cut to special lengths as ordered. Man'd by Garland Chain Co., Rankin, Pa.

## EDWARD CORNING & CO.,

MANUFACTURERS' AGENTS AND COMMISSION MERCHANTS

BEAMS, CHANNELS,  
ANGLES, TEES, PLATES,  
RIVETED GIRDERS.

## IRON AND STEEL,

BARS, BANDS, HOOPS,  
BOLTS, NUTS, RIVETS,  
ROOF TRUSSES.

29 BROADWAY,  
NEW YORK.

421 CHESTNUT ST.,  
PHILADELPHIA.

70 KILBY ST.,  
BOSTON.

OUR OFFICES AND MILLS ARE CONNECTED BY TELEPHONES.

**EDWARD J. ETTING,**  
IRON BROKER & COMMISSION MERCHANT  
223 S. THIRD ST., PHILADELPHIA, PA.  
Pig, Bar and Railroad Iron, Old Rails, Scrap.  
AGENT FOR THE  
**MOUNT SAVAGE FIRE BRICK,**  
Eastern Penna., West New Jersey and Delaware.  
**Agent TRENTON IRON CO.,**  
For the Sale of Wire and Wire Rope.  
Longdale (Va.) and other Pig Irons.  
STORAGE YARD, Pier No. 57 South (old Navy Yard),  
which is connected with Penn. R. R. and its various  
connections. Negotiable Warehouse Receipts issued.  
CASH ADVANCES MADE ON IRON.

ESTABLISHED 1869.  
**JEROME KEELEY & CO.,**  
The Philadelphia Bank Bldg., 421 Chestnut St.,  
PHILADELPHIA.  
**Foundry, Forge Pig Irons,**  
**Iron Ores, Coke, Coal,**  
**Steel Blooms, Billets, Rails, etc.**  
**Muck Bars, Blooms, Scrap Iron.**  
Consulting Engineers in Metallurgy and Mining.

**JUSTICE COX, JR.,**  
218 South 4th St., Phila., Pa.  
**IRON and STEEL.**  
— AGENT FOR —

Haldeman, Grubb & Co.'s.  
Chickies Bessemer Pig Iron.  
Mahoning Rolling Mill Co.'s  
Best Quality Skelp Iron and Steel.  
Pulaski Iron Co.'s  
High Grade Foundry and Forge Pig Iron.  
Hainsworth Steel Co.'s  
Standard Bessemer Steel Billets.  
Bars, Angles, Sheets, Tank and Bridge  
Plates, Muck Bars, Blooms, Scrap Iron  
and Tool Steel.

**J. W. HOFFMAN & CO.,**  
Bullitt Building, 135 So. 4th St., Philad'a,  
Iron and Steel Merchants.  
**PIG IRON,**  
Iron and Steel Plates, Sheets, Bars and Shapes. Rails  
Cars and Locomotives. Track Equipment.  
CORRESPONDENCE SOLICITED.

**JOHN L. HOGAN & CO.,**  
IRON COMMISSION MERCHANTS,  
Bullitt Building, 135 South Fourth St., Phila.  
**Agents for Brier Hill, Lehigh, Struthers**  
**AND MUIRKIRK PIG IRON,**  
Delaware Rolling Mill, muck bars, Youngstown Steel  
Co., Connellsville Coke.

**W. H. THOMSON & CO.,**  
Dealers in  
**IRON and STEEL and**  
**other METALS**  
FOR ALL PURPOSES,  
Room 373, Bullitt Building,  
PHILADELPHIA, PA.

C. B. Houston. J. Max Bernard. H. H. Houston.  
**C. B. HOUSTON & CO.,**  
Bullitt Building, PHILADELPHIA.  
Pig Iron, Coal, Coke, Steel Rails, Structural  
Iron, Steel Castings and Fire Brick.  
Sole Agents for Paxton Rolling Mills.  
**STEEL AND IRON PLATES.**

**FRANCIS WISTER**  
COMMISSION MERCHANT,  
**Coke, Coal, Ores.**  
PEA AND BUCKWHEAT (Red and White Ash),  
National Foundry Coke a Specialty. Sulphur less  
than 0.5.  
All Sizes National Crushed Coke.  
420 Walnut Street, PHILADELPHIA.

W. S. PILLING.

T. I. CRANE

**PILLING—AND—CRANE.**  
**IRON ORES:** Lake Superior, Foreign, Concentrates,  
Magnetic and native Self-fluxing.  
**PIG IRON:** Low Phosphorus, Open-hearth, Bessemer  
and other grades.  
**STEEL:** In Blooms, Slabs and Billets, and scrap.  
**COKE:** For Furnace and Foundry use.  
BULLITT BUILDING, 141 S. FOURTH ST., PHILADELPHIA.

**ALAN WOOD COMPANY,**  
MANUFACTURERS OF  
Patent Planished, Galvanized, Common, Best Refined, Cleaned and Charcoal Bloom,  
**PLATE & SHEET IRON.**  
ALSO LIGHT PLATES AND SHEETS OF STEEL,  
No. 519 Arch Street, Philadelphia, Pa.  
Orders solicited especially for Corrugated, Gasholder, Pan and Elbow, Water Pipe, Smoke Stack,  
Tank and Boat Iron; Last, Stamping, Ferrule, Locomotive Headlight and Jacket Iron.

**J. J. MOHR,**  
Bullitt Building, No. 131 South Fourth St., Philadelphia, Pa.  
—SOLE AGENT FOR—  
Sheridan, Temple, Brooke, Leesport, Mill Creek, Keystone, Mt. Laurel, Logan and Oley FOUN-  
DRY, FORGE, CHARCOAL AND BESSEMER PIG IRON.  
Dealer in Scrap, Old Car Wheels, Muck Bars and Connellsville Coke.

**JAMES G. LINDSAY & CO.**  
BULLITT BUILDING, 133 South Fourth St., PHILA.  
**IRON and STEEL STRUCTURAL MATERIAL**  
For all purposes. Estimates Furnished for Iron and Steel Structures.

**CRESCENT STEEL CO.**  
480 PEARL ST. NEW YORK PITTSBURGH, PA. 64 & 66 S. CLINTON ST. CHICAGO.

**STEEL ROOFING**  
CORRUGATED IRON EAVE TROUGH  
CONDUCTOR PIPE ROOF PAINTS ETC.  
CORRESPONDENCE SOLICITED THE CAMBRIDGE ROOFING CO. CAMBRIDGE, MICH.

**EDITION FOR 1894.**  
**DIRECTORY**

— OF THE —  
**Iron and Steel Works**  
OF THE UNITED STATES.

Embracing a complete list of the Blast Furnaces, Rolling  
Mills, Steel Works, Forges and Bloomeries in every State and  
Territory; also Wire Mills, Wire Nail Works, Car Axle Works,  
Car Wheel Works, Car Builders, Locomotive Works and Cast  
Iron Pipe Works and Wrought Iron Pipe Works, Tin Plate  
Works, Rod Mills, Cut Nail Works, Shipbuilding and Bridge-  
building Works. 304 pages, cloth.

Published by The American Iron and Steel Association.

**PRICE, - - - \$5.00.**

Sent on receipt of price by

**DAVID WILLIAMS,** - Publisher and Bookseller,  
96-102 Reade Street, NEW YORK.



# FRANCIS HOBSON, SEAMAN & CO.

Successors to FRANCIS HOBSON & SON,  
DON STEEL WORKS, SHEFFIELD.

Sole Manufacturers of

HOBSON'S "CHOICE" **(XX)** Extra Best and "Warranted Best"  
Cast Steels for Tools, etc.

HOBSON'S "CHOICE" Extra Quality Needle Wire.

SEAMAN'S "NELSON" Brand Extra Cast Steel for Turning Hardest Chilled Rolls, &c.  
WAREHOUSE, 97 John St., New York. CHAS. HUGILL, Agent.

THOS. FIRTH & SONS, LIMITED, SHEFFIELD.  
CRUCIBLE CAST STEEL.

ABBOTT, WHEELOCK & CO., Agents and Importers of  
**SWEDISH IRON,**

35 OLIVER ST., BOSTON.

23 CLIFF ST., NEW YORK.

**S. & C. WARDLOW, SHEFFIELD, ENGLAND.**  
Manufacturers of the Celebrated Cast and Double Shear Steel,

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Razors, Carvers, Butchers' Knives, Files, Band Saws, Clock, Watch  
and all other Springs; also Sole Makers of the Special Brand "TOUGH" Cast Steel for Leather Splitting and  
Machine Knives of every description, and for Turning and all other Tools, Dies and Punches.

Office and Warehouse, 95 John St., New York.

Frank S. Pilditch, Agent.

CARLISLE **KAYSER, ELLISON & CO., SHEFFIELD, ENGLAND**  
WORKS, Late WILSON HAWKSWORTH, ELLISON & CO.,

(ESTABLISHED 1825.)

CRUCIBLE STEEL AND STEEL WIRE.

WETHERELL BROS., Agents.

81 OLIVER STREET, BOSTON.

93 LIBERTY STREET, NEW YORK.

**JONAS & COLVER CONTINENTAL STEEL WORKS, SHEFFIELD, ENGLAND,**

MANUFACTURERS OF ALL KINDS OF STEEL.

Tool Steel, Drill Rods, Needle Wire, Hot Rolled Sheet Steel, Cold Rolled Steel for Cor-  
set Springs, Band Saws, Clock and Watch Springs and Parts, and all other Purposes.

**HERMANN BOKER & CO., 101 & 103 Duane Street,**

(Formerly CARL F. BOKER),

Sole Agents and Importers of Steel and Crucible Wire Rods, &c.

**JESSOP'S STEEL**

MANUFACTURED BY

**WM. JESSOP & SONS, L'D.**

OF Best Quality,  
IN Bars, Sheets AND Plates.

Large assortment of sizes in stock at

91 John St., - - - - - NEW YORK.

And other Agencies.

SHEFFIELD,  
ENGLAND.

Gold Medal Paris,  
1889.

**"F. W. MOSS" SHEFFIELD STEEL & FILES**

For further particulars apply  
to  
NEWTON &  
SHIPMAN.

53 John St., New York.

Prices for Direct Importation in Wholesale Quantities From Sheffield.

Improved Mild Centered Cast Steel for Taps, Reamers, &c	@ 25%	Per ton in Sheffield.
Warranted Extra Cast Steel for Taps, Dies, Milling Tools, &c.	" 50	" " "
Warranted Cast Steel for tools, Taps, Dies, Turning Tools, &c.	" 44. 10/	" " "
Best Crucible Machinery Steel	" 30	" " "
Best C. S. EXTRA WEIGHT HAND CUT FILES	@ 50% & 4% cash discount	" " "

No charge for extra sizes when steel is ordered in wholesale quantities of assorted sizes.

Stay-Bolt,  
Rivet, D. Link,  
Axe, Hatchet,  
Carriage and  
Wagon Axle

**IRON.**

Superior Quality Refined Bar Iron  
"VULCAN" AND "LOCKHART" BRANDS.



SMALL CHANNELS AND ANGLES,  
**HEXAGON IRON AND STEEL.**

All  
Merchant Bar  
Sizes  
of  
Soft  
**STEEL.**

CLIFFLIN WHEELER.

G. W. NICOLLS.

**Nicolls, Wheeler & Co.,**

FORMERLY

SITES, WHEELER & CO.,

116 South Third St., Philadelphia, Pa

—DEALERS IN—

**IRON AND STEEL SCRAP.**

Pig Iron, Muck Bars, Charcoal Blooms, &c., &c.,  
Steel and Iron Plates, New and Old Rails.



**ÆTNA-STANDARD IRON & STEEL CO.,**  
 MANUFACTURERS OF  
**BLACK SHEETS, GALVANIZED, CORRUGATED, TIN AND TERNE PLATES,**  
 Sheets Suitable for All Purposes, Cold Rolled or Common, Patent Leveled and Other Specialties, Roofing and Building Supplies.  
**BARS, LIGHT STRUCTURAL SHAPES AND RAILS.**  
 Bars, all sizes and qualities, Angles, Tees, Channels, Steel Tire and Toe Calk. Special Sizes and Shapes Made to Order.  
 WRITE FOR CATALOGUE AND PRICES. Large Stocks Carried to Facilitate Prompt Shipment. **BRIDGEPORT, OHIO.**

## **CARBON STEEL COMPANY, PITTSBURCH, PA.**

MANUFACTURERS OF

Universal Mill Plates.  
 Sheared Plates and  
 Sheets.



Boiler, Ship and Armor  
 Plates.  
 Also Nickel Steel Plates.

**LIST OF SIZES SENT UPON APPLICATION.**

Eastern Office, Havemeyer Building, New York.

Western Office, Western Union Building, Chicago.

### AGENCIES:

L. S. BOOMER, 647 The Rookery, Chicago, Ill.

THE CONDIT-FULLER CO., Perry-Payne Building, Cleveland, O.

GEO. KINSEY & CO., 249 West Fourth Street, Cincinnati, O.

JAS. G. LINDSAY & CO., Bullitt Building, Philadelphia, Pa.

## **- R. M. USHET'S -** **"SPECIAL," STEEL "TITANIC,"**

FOR  
 LATHE AND PLANNER TOOLS.

For Chisels, Taps, Dies, Chilled Roll  
 Turning, Punches, &c., &c.

(The "Trade-Marks" of which are registered in the United States.)

MANUFACTURED ONLY BY

SAMUEL OSBORN & CO., Clyde Steel & Iron Works, Sheffield, Eng.

SOLE REPRESENTATIVES IN THE UNITED STATES,

**B. M. JONES & CO., Nos. 11 and 13 Oliver St., Boston.**

No. 143 LIBERTY STREET, NEW YORK.

## **RIVERSIDE IRON WORKS,**

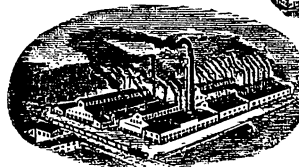
Manufacturers of

**"RIVERSIDE"**  
**Steel Nails.**

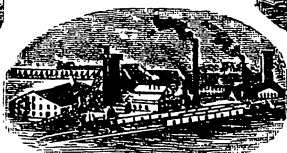
Bessemer, Forge and  
 Foundry Pig Iron.



RIVERSIDE FURNACE, BESSEMER  
 STEEL PLATE MILL AND TUBE DE-  
 PARTMENTS AT BENWOOD, W. VA.



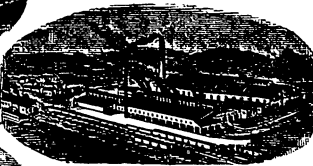
BAR MILLS, FORGE AND COAL MINES AT  
 WHEELING, W. VA.



FURNACE AND COAL SHAFT AT STEUBENVILLE

**"RIVERSIDE"**  
**Steel Pipe.**

Steel Billets, Blooms, Bar  
 Steel, T and Flat Rails.



NAIL FACTORIES AND WAREHOUSE AT  
 WHEELING, W. VA.

## **WHEELING, - - W. VA.**

REPRESENTATIVES: CHAS. S. STEPHENS, No. 21 Beekman St., New York; E. R. MANN & CO., No. 147 So. 4th St., Philadelphia, Pa.; CASEY & DAY, No. 446 Rookery, Chicago, Ill.; THE HAZEN CO., No. 69 W. 4th St., Cincinnati, O.

## **THE GARTLAND FOUNDRY CO.,**

MANUFACTURERS OF

Light Work our **Soft Grey Iron Castings.** We are prepared  
 Specialty. to do Japanning and Galvanizing.

UNION and ECHO STS.,  
 Cleveland, Canton & Southern R. R.,

**CLEVELAND, O.**

JOHN H. RICKETSON, Prest.

A. G. BARNETT, Treas.

W. L. RICKETSON, Supt.

O. G. RICKETSON, Vice-Prest

A. G. MCCLINTOCK, Sec'y.

## **A. GARRISON FOUNDRY CO.,**

Manufacturers of Sand, Patent Homogeneous Steel and

## **CHILLED ROLLS:**

Ore and Clay Pulverizers, Rotary Squeezers, Haskin's Patent Double Spiral Pinions and Rolling Mill Castings of every description.

Office: Nos. 10 & 12 Wood St., - PITTSBURGH, PA.

## **FLINT & CO.,**

68 Broad St., New York,

### **EXPORTERS**

-OF-

Rolling Stock, Rails and Railway Supplies  
 of all kinds, Bar and Sheet Iron and  
 Steel, Cast and Wrought Iron  
 Pipe, Boiler Plates, Barb  
 Wire, and all sorts of  
 Steel and Iron Man-  
 ufactures to

**SOUTH AMERICA and WEST INDIES.**

### AGENCIES:

Quayle, Davidson & Co. - - Rio de Janeiro.  
 Luis de Olazarra. - - Havana.  
 Winfield S. Stern, - - Valparaiso.  
 F. L. Crosby, - - Lima  
 E. Pavia, - - Guayaquil.

Correspondence solicited from Manu-  
 facturers interested in export.

## **Light AND Medium Weight GRAY IRON CASTINGS.**

WE SOLICIT CORRESPONDENCE  
 WITH THOSE WHO USE THE ABOVE.

★ We claim to have  
 few equals and no  
 ★ superiors in quality.

We have unusual capacity.  
 Two seven-foot cupolas.

The Taylor &  
 Boggis Fdy. Co.

521 Seneca St., Cleveland, O.

ESTABLISHED IN 1848. **SINGER, NIMICK & CO., Ltd.** PITTSBURGH, PA.

—MANUFACTURERS OF ALL KINDS OF—

**Hammered and Rolled STEEL.** Warranted Equal to any Produced.**HIGH GRADE SPECIAL** Crucible Tool Cast Steel, for all purposes requiring the **very finest** quality.**SINGER'S ANNEALED EXTRA** Crucible Tool Cast Steel, for Dies, Cutters, Surgical Instruments, Forceps, and all other purposes requiring an **extra fine** quality.**BEST** Crucible Tool Cast Steel, for all purposes requiring steel of **Standard** quality, such as Turning Tools, Taps, Dies, Drills, Punches, Shear Knives, Cold Chisels, or Edge and Machinists' Tools generally, and for Mining and Quarrying purposes.**SAW STEEL**, for Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.**HOT ROLLED SHEET STEEL**, for Springs, Billet Web and Hand Saws, Nicker Saws, Pocket Knives, Blades and Backs, Drawing and Stamping Cold, &c., &c.**BRIGHT COLD ROLLED SHEET and STRIP STEEL**, for Cold Drawing, Stamping and Bending; for Bells, Cups, Ferrules, Springs, Keys, Chains, Sewing Machine and Type-Writer parts, and to take the place of Sheet Brass, all of unequaled finish and accuracy of gauge,**ROUND MACHINERY STEEL**, for Shafting, Rollers, Spindles, &c., &c.**AGRICULTURAL STEEL.**

"Iron Centre" Cast Plow Steel.

"Soft Steel Centre" Cast Plow Steel.

"Soft Steel Back" Cast Plow Steel.

"Extra Thick Face Centre" Cast Plow Steel.

"Special" (Solid Soft Center) Plow Steel.

Crucible Cast Plow Steel.

Steel Rotary Harrow Discs.

Finished Rolling Plow Colters.

Agricultural Steel Cut to Pattern.

Also Wagon and Carriage Springs, Axles and Steel Tire.

Represented at **243 Pearl and 18 Cliff Streets, NEW YORK**, by**HOGAN & SON, General Agents for Eastern and New England States.**

GEORGE M. HOGAN, 417 Commerce St., Philadelphia; FITZ, DANA &amp; CO., 110 North St., Boston, and

W. E. STOCKTON, 16 &amp; 18 West Lake St., Chicago.

HUGH RUSSEL, TEMPLE BUILDING, 185 ST. JAMES ST., MONTREAL, CANADA.

**LA BELLE STEEL CO.**

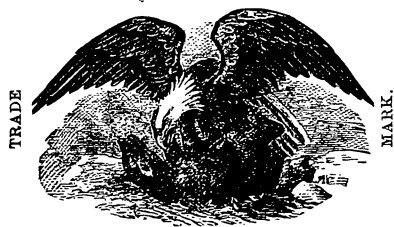
Ridge Avenue and Belmont Street, Allegheny City, Pa. Post Office Address, Pittsburgh, Pa.

**MANUFACTURERS OF ALL KINDS OF STEEL SPRINGS, AXLES, RAKE TEETH, Etc.****WETHERELL BROS., EASTERN REPRESENTATIVES, 31 Oliver St., Boston, and 93 Liberty St. N.Y**

Canadian Agent, W. C. BLYTH, No. 76 York St., Toronto, Ont.

**J. TATNALL LEA & CO.,**

No. 125 So. Fourth St., Philadelphia.

**BESSEMER, MILL AND FOUNDRY PIC IRON,  
MUCK BARS AND IRON ORES.****W. Dewees Wood Co.,**

MANUFACTURERS OF PATENT

**PLANISHED SHEET IRON.**

PATENTS:

Dec. 10th, 1878.	Mar. 4th, 1884.	Aug. 31st, 1886
Jan. 10th, 1882.	April 15th, 1884.	Jan. '1st, 1889.
Jan. 1st, 1884.	June 10th, 1884.	Jan. 17th, 1893
Feb. 12th, 1881.	Jan. 6th, 1885.	

Guaranteed fully equal, in all respects, to the Imported Russia Iron.

—ALSO—

**Wood's Smooth Finished Sheet Irons and Sheet Steel, Cleaned and Free from Dust.**

GENERAL OFFICES AND WORKS:

**McKeesport, Pa.**

Branch Office: 111 Water Street, Pittsburgh, Pa.

**The Practical Polish and Varnish Maker.**  
By H. C. STANDAGE. A treatise containing 750 receipts and formulae for the manufacture of varnishes, polishes, &c. 12mo. cloth.....\$2.50  
For sale by David Williams, 96 102 Reade St., N. Y.

— SOHO IRON & STEEL WORKS —

**MOORHEAD & McCLEANE CO.**  
MANUFACTURERS OF

**PLATE IRON & STEEL.**  
**GALVANIZED SHEET IRON**

**SOHO CHB TRADE MARK**

**PLATES SPECIAL WIDE SHEETS AND EXTRA LONG SKELP IRONS**

**OFFICES AND WORKS. PITTSBURGH.**

**EASTERN WAREHOUSE. No. 81 JOHN STREET, NEW YORK.**

**WESTERN WAREHOUSE. Nos. 16 & 18 W. LAKE ST. CHICAGO.**

**STANDARD FOUNDRY & MFG. CO., - CLEVELAND, OHIO.**

—HEADQUARTERS FOR—

**LIGHT GRAY IRON CASTINGS,**

—UNEQUALED IN—

**SOFTNESS and SUPERIOR FINISH.**

Our Castings in finishing will save time and tools. We solicit a trial order knowing that we can please you. Send samples for prices.

# THE BETHLEHEM

IRON COMPANY,

SOUTH BETHLEHEM, PENNA.

STEEL RAILS,

BILLETS AND MUCK BAR,

STEEL FORGINGS.

HOLLOW SHAFTING, CRANKS, ROLLS, GUNS AND ARMOR.

Rough, Machined or Finished, Fluid Compressed, Hydraulic Forged.

NEW YORK OFFICE, - - - 80 BROADWAY.

PHILADELPHIA OFFICE, - - - 421 CHESTNUT ST.

## THE S. OBERMAYER CO.,

Cincinnati, O., and Chicago, Ills.

—MANUFACTURERS OF—

FOUNDRY FACINGS, SUPPLIES and EQUIPMENTS

—IMPORTERS AND REFINERS OF—

East India Plumbago, Black Lead and Graphite.

Brass and Iron and Steel Foundries completely equipped.

General Catalogue sent on Application.

PASSAIC ROLLING MILL CO., Paterson, N. J.

—MANUFACTURE—

## ROLLED STEEL or IRON BEAMS

Channels, Angles, Tees, Bars, Riveted Work, Forgings, Eye Bars, &c., &c.,

Also OPEN HEARTH STEEL BILLETS and SLABS.

NEW YORK OFFICE, - Rooms 151 and 152, No. 45 Broadway.

## THE MONTGOMERY IRON & STEEL COMPANY,

DANVILLE, PA.



PIG IRON, T AND STREET RAILS,

Light Rails, 12 to 40 lbs. per yard.

RAIL JOINTS, SPIKES AND BAR IRON.

—ESTABLISHED 1850.—

ARCADE MALLEABLE IRON CO.

WARREN McFARLAND & CO.

Malleable Iron and Steel Castings,

WORCESTER, MASS.

Correspondence solicited. Prices given upon receipt of patterns or samples.

GEO. B. BUCKINGHAM.

To Blast Furnace Managers:

### THE Hawdon Slag Machine,

for handling blast-furnace slag, has been thoroughly tested in actual practice.

It saves labor in loading and unloading.

Slag is delivered to cars in small pieces, perfectly cooled.

It saves cost of special cars and expensive repairs.

Cost of pig is reduced and slag may be profitably used.

Write to us for further information in regard to advantages, cost of construction and terms of license, or call and see the machine in operation at our Blast Furnaces.

Cambria Iron Company, - Johnstown, Pa.,

—UNITED STATES AGENT—

## "CATASAUQUA"

HIGH GRADE

# Bars.

CATASAUQUA MFG. CO.

Charles K. Barns & Co., Agents,

224 South Fourth St., PHILADELPHIA.

L. & R. WISTER & CO.,

257 So. 4th St., Philadelphia.

Dunbar Foundry and Forge Irons.

Kemble Pig Iron.

Tuscarawas (Black Band).

Warner & Co's Wash Irons.

Dealers in all kinds of Scrap Iron and Steel.

HENRY LEVIS & CO.,

Manufacturers' Agents

For Iron and Steel Rails, Car Wheels, Boiler and Sheet Iron and General

Railway Equipments.

Old Rails, Axles and Wheels bought and sold.

234 S. 4th St., Philadelphia.

## Manhattan Rolling Mill,

JOHN LEONARD,

446 to 452 West St., New York.

MANUFACTURER OF

Horse Shoe Iron and Horse Shoes.

The quality of Iron used in the manufacture of the shoe is the original

Leonard Celebrated Iron.

## OGDEN & WALLACE,

577, 579, 581 & 583 GREENWICH ST.,

NEW YORK.

## IRON AND STEEL

Of every description kept in stock.

BLACK DIAMOND STEEL.

All sizes of Cast and Machinery Steel constantly on hand.

WILLIAM H. WALLACE & CO.,

## IRON AND STEEL,

66 Broadway, New York.

Wm. H. Wallace. Wm. Bispham. E. C. Wallace.

## THE MAHONING VALLEY IRON CO.

—MANUFACTURERS OF—

Bar, Band, Sheet, Plate and Tank Iron,

Angle Iron, Nails, Boat Spikes and Rivets,

YOUNGSTOWN, OHIO.

## EXHAUST TUMBLERS,

Hexagon, Round or Wooden

BEST AND CHEAPEST.

WM. A. SWEETSER

39 Montello St., Brockton, Mass.

**BIRMINGHAM IRON FOUNDRY,**

BIRMINGHAM, CONN.

**CHILLED ROLLS AND ROLLING  
MILL MACHINERY,****McCoy Patent Mill Pinions,  
Shears, Rotary Squeezers  
WIRE DRAWING MACHINERY**Special Rolling Machines for Gun Bar-  
rels, Hoes, Pick and Axe Polls, Odd  
Shapes and Tapers.

ESTABLISHED

1836

**POWDER**

—FOR—

**Blasting, Mining and Sporting  
ORANGE BRAND.  
ELECTRIC BLASTING APPARATUS  
SAFETY FUSE, &c.**Send postal card for Illustrated Pamphlet  
showing sizes grains Powder, and describing  
Blasting Apparatus. Mailed FREE.**LAFLIN & RAND POWDER CO.,**

New York Office, 29 Murray St.

**DYNAMITE,****RED STAR BRAND,**

For Mining, Quarrying and Stump Blasting.

Safety Fuse, Caps, Platinum Fuse, Leading  
and Connecting Wire, with every other requi-  
site for Blasting Purposes. The especial atten-  
tion of the hardware trade is invited to our  
line of goods.**NEW YORK POWDER CO.,**

62 Liberty St., New York.

**Patent Tumbling Barrels.**

MANY VARIETIES

For all Kinds of Work.

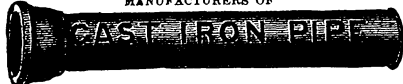
Send for new Catalogue.

**HENDERSON BROS.,** WATERBURY, CONN**S. CHENEY & SON;  
GRAY IRON CASTINGS**

CHEAP HEATING STOVES,

DIAMOND THIMBLES

MANLIUS, N. Y.

**DONALDSON IRON COMPANY.**  
MANUFACTURERS OF**CAST IRON PIPE,**And Special Castings for Water and Gas. Also Flange Pipe.  
EMAUS, LEHIGH CO., PA.**FINE GRAY IRON****FRANKLIN IRON FOUNDRY,  
The Burr and Houston Company**83-89 Franklin Street, Brooklyn (Green-  
point), N. Y.Special Attention Given to Fine Castings.  
Telephone Call, Greenpoint 174**CHESS BROTHERS,**

MANUFACTURERS OF A FULL LINE OF

**SMALL CUT NAILS, TACKS, SHOE NAILS, ETC.**

Always in stock. Special goods made to order.

**SOFT STEEL PLATES.**Suitable for Implement manufacture and for all Blanking or Stamping uses,  
of good surface, rolled carefully to gauges, ranging from No. 6 to 16, inclusive; in  
widths up to 15½ inches and to multiples of lengths desired. Finished black or  
scaled. And**EXPANDED METAL**

In all its varieties of

**Fire-Proof Lath, Fencing, Tree Guards, &c.**

Send for catalogues and prices.

Office, 531 Wood St., PITTSBURGH, PA.

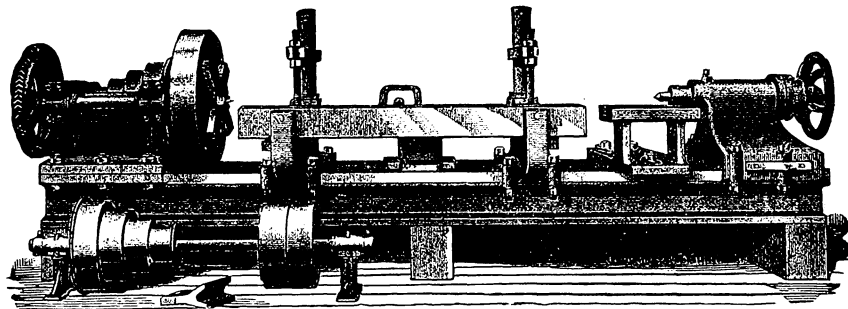
J.S. SEAMAN  
ROBT. SLEETH  
GEO. P. BLACK

PHOENIX ROLLWORKS  
SEAMAN, SLEETH & BLACK  
OFFICE & WORKS  
41ST & 42ND ST & AV. R.  
PITTSBURGH, PA.

ESTABLISHED 1870

ROLLS AND PINIONS  
EXCLUSIVELY  
FOR ALL PURPOSES.

MANUFACTURE AND FINISH

**NEW IMPROVED STANDARD ROLL LATHE.**Made by **TOTTEN & HOGG I & S FOUNDRY CO.,** Pittsburg, Pa., Manufacturers of  
**CHILL ROLLS AND ROLLING MILL MACHINERY.**

GEORGE MESTA, Prest.

W. D. ROWAN, Sec.

J. O. HORNING, Treas.

**LEECHBURG FOUNDRY & MACHINE CO.,**

Office: LEWIS BLOCK, Pittsburgh, Pa.

Sheet and Bar Mills, Shears, Squeezers and Roll-Lathes

**ROLLS. MESTA'S PATENT PICKLING MACHINES AND TIN  
PLATE MACHINERY.**

ESTIMATES GIVEN ON COMPLETE TIN PLATE PLANTS.

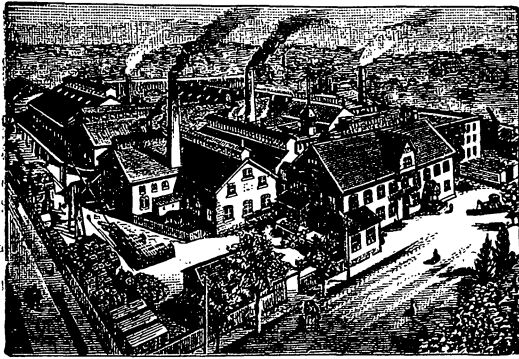
RAIL.  
BEAM.  
BAR.**ROLLS**STRUCTURAL.  
SPECIALS.  
SHAPES.**EAST CHICAGO FOUNDRY COMPANY,**

Office, 716 "The Rookery,"

CHICAGO.

**COLD DRAWN STEEL****SHELBY STEEL TUBE CO.****SEAMLESS TUBING**The first in America. The largest and  
best in the world. Now prepared to make  
all shapes and sizes, including round,  
square, octagon, corrugated, and half circle with  
double re-entering angles. Address, for sam-  
ples and prices, **SHELBY, OHIO.**

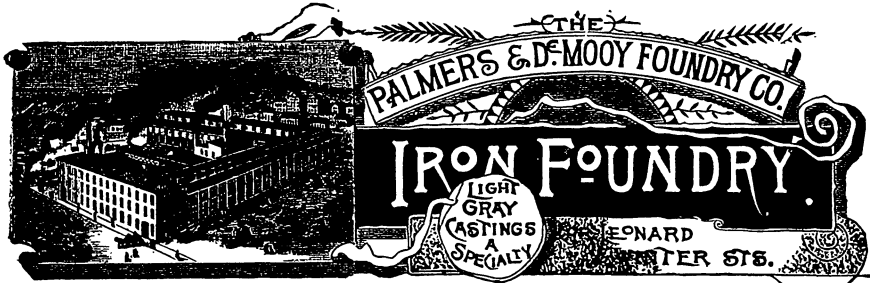




# Sessions Foundry Co., BRISTOL, CONN. IRON CASTINGS TO ORDER.

We make small and large castings of all descriptions, of best quality, and at very low prices.

**CORRESPONDENCE SOLICITED.**



Soft Castings for Electrical Work and Sewing Machines. Fine Light Gray Iron Castings. Metal Patterns designed and made. Also Japanning and Galvanizing.

CLEVELAND, O.

## STEEL CASTINGS

FROM 1 to 40,000 POUNDS WEIGHT,  
Of Open Hearth, Chester or Bessemer Steel.  
*True to Pattern. Sound. Solid.*  
Gearing of all kinds, Crank Shafts, Knuckles for Car Couplers.  
*Cross-Heads, Rockers, Piston-Heads, etc., for Locomotives.*  
Steel Castings of Every Description.  
Chester Steel Castings Co.  
Works, Chester, Pa. Office, 407 Library St., Philadelphia, Pa.

ROLLING MILL MACHINERY AND

## ROLLS.

THE ROBINSON-REA MFG. CO., Pittsburg, Pa.

## FOUNDRY FACINGS

sold under the name of "Radiant" are known all over the world as the best and are used by progressive foundries who want to turn out good clean castings.

If you don't use it and wish to try some send for free sample.

THE J. D. SMITH FOUNDRY & SUPPLY CO., - CINCINNATI, O.

## DROP FORGING.

ESTIMATES GIVEN ON APPLICATION.

Sole Manufacturers of Ahlstrom's Patent Parallel Double

**EXPANSION BOLTS,**

also Single Expansion Bolts. Catalogues mailed on Application.

W. C. BOONE MFG. CO. - Office and Factory, - BOONTON, N. J.

**Wm. Swindell & Bros..**  
548 Smithfield Street, - Pittsburgh, Pa.  
CONSULTING AND CONTRACTING ENGINEERS.

Regenerative Gas Furnaces for all purposes. Duff's Patent Water Seal Gas Producers, Swindell's Improved Gas Producers, 329 built in three years. Patent Annealing and Enameling Furnaces.

Plans and Specifications furnished at a reasonable cost for all kinds of furnace work.

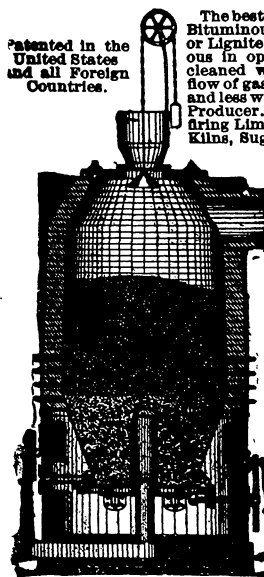
R. D. Wood & Co. 400 Chestnut St., PHILADELPHIA.

SOLE MAKERS OF THE

## TAYLOR REVOLVING-BOTTOM GAS PRODUCER.

The best Producer for either Bituminous or Anthracite coal or Lignite; absolutely continuous in operation, as the fire is cleaned without stopping the flow of gas. Less labor required and less waste than in any other Producer. Producer Gas for firing Lime, Brick and Pottery Kilns, Sugar-house Char Kilns, Boilers, etc.

Also applicable to all Regenerative Furnaces. Send for Pamphlet.



## CAST IRON PIPE

MATHEWS' FIRE HYDRANTS EDDY VALVES, VALVE INDICATOR POSTS.

Heavy Loam Castings Special Machinery.

Water Power Pumps and TURBINES.

HYDRAULIC JIB and TRAVELING CRANES, FREIGHT and CAR LIFTS, Etc. GAS HOLDERS and GAS MACHINERY.

## The Iron-Masters' LABORATORY

Exclusively for the

Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

Branch Office, 339 Walnut St., Philadelphia.

All Analytical Work at Warrenton, Virginia.

J. BLODGET BRITTON.

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes, the object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

**HIGH GRADE  
LIGHT GRAY IRON CASTINGS**  
SOFT, SMOOTH and EASILY DRILLED.  
Patented Articles a Specialty.  
SUPERIOR QUALITY. PRICES LOW.  
**Allentown Hardware Works,**  
ALLENTOWN, PA.



ROLL

LATHES.

TRETHERWEY MFG. CO., - 47th ST., PITTSBURGH, PA.

MANUFACTURERS OF

Hardened Forged Steel Rolls, Roll Turning Tools, Solid Steel Shear Knives, Tool Steel Dies of any size, Forgings of Machinery or Tool Steel, Rolling Mill Machinery, Steam Hammers, Squaring Shears, Double Headed Rotary Shears, Shear Grinding Machinery, Circle Cutting Machines.

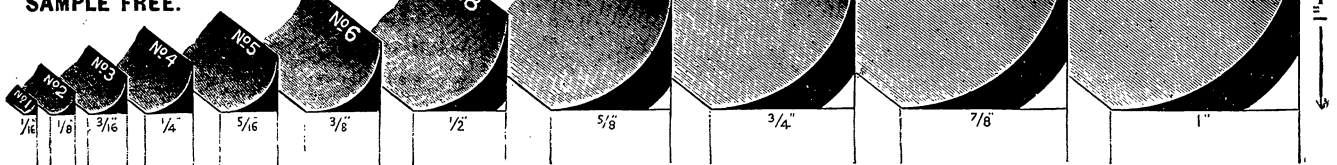
SMITH'S LABOR-SAVING LEATHER PATTERN FILLET.

Can You Afford to Make Fillet by Hand?

We Sell to Consumers Only.

ORDER BY NO.

SMITH'S PATTERN WORKS,  
SOLE MFRS., - - - AKRON, O.  
SAMPLE FREE.



TURN



S

Wrought Iron Open Hexagonal, made from the best Charcoal Iron.

The only Buckle made that has a perfect wrench hold.

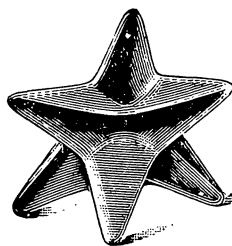
Guaranteed stronger than any similar article on the market.

R. R. SPIKES, BAR and IRON CAR AXLES.

The Central Iron & Steel Co., Brazil, Ind.

Tumbling

Stars.



Torrance

Iron Co.,

EXTRA HARD.

TROY, N. Y.

ALEX LAUGHLIN & CO.  
LEWIS BLOCK, PITTSBURGH, PA.

Gas Heating  
Gas Puddling  
Open Hearth  
Crucible  
Tube Welding

FURNACES

AND ARTIFICIAL GAS PRODUCERS OF EVERY DESCRIPTION, for ROLLING MILLS STEEL AND TUBE WORKS.  
We guarantee to place all Plants erected by us in successful operation.

THE S. R. SMYTHE COMPANY.

LEWIS BLOCK, ENGINEERS AND CONTRACTORS, PITTSBURGH, PA.

Regenerative Gas Furnaces and Gas Producers  
For All Purposes.

TUBE, STEEL, ROLLING MILLS, GLASS WORKS CONSTRUCTION, Etc.

We contract for complete Plants, guarantee results and operation. OVER 100 PLANTS BUILT AND WORKING.

McAULEY FEED WATER HEATER AND PURIFIER. Clean Boilers Guaranteed at small cost. No scale, better service, and saving in fuel.

HENRY AIKEN,

Consulting Mechanical Engineer

Rooms 203-206 Lewis Block,  
PITTSBURGH, PA.

JULIAN KENNEDY.

Consulting and Contracting Engineer,

Rooms 36, 37, 38, 39 Vandergrift Building, Pittsburgh, Pa.

Blast Furnaces, Bessemer and Open Hearth Steel Works, Rolling Mills,  
STEAM AND HYDRAULIC MACHINERY, &c.

—Branch Office of The Latrobe Steel Works.—

JAMES HEMPHILL, President.  
WM. H. CONLEY, Treasurer.

THOS. B. RITER Vice-President.  
JNO. F. WILCOX, Gen'l Manager.

## PITTSBURG IRON & STEEL ENGINEERING CO.

LEWIS BLOCK, PITTSBURG, PA., U. S. A.

### BESSEMER AND OPEN-HEARTH STEEL PLANTS.

Rolling Mills (Blooming, Rail, Plate, &c). Blast Furnaces, Engines  
Boilers, Bridges, Girders, Iron Buildings.

WORKS BUILT COMPLETE and Fully Equipped for Operation.

## THE D. R. LEAN COMPANY, Blast Furnace and Steel Plant Construction,

Penn Building, Pittsburgh, Pa.

**J. A. HERRICK, M. E.,**  
Consulting Engineer and Contractor:  
Room 609, 284 Pearl Street, NEW YORK.

— **STEEL CASTING PLANTS A SPECIALTY.** —

Melting and Heating Furnaces of ALL KINDS.

Patent Gas WATER VALVES. Improved "BASIC" and "SEMI-STEEL" Processes and FURNACES.  
New CONTINUOUS Gas PRODUCERS.

## PHILADELPHIA CORLISS ENGINES,

Air Pumps. Condensers, Feed Water Heaters,  
Steel Plate Chimneys, Iron Tanks, Stand  
Pipes, Steel Buildings.

BLAST FURNACES. HOT BLAST STOVES.

**Philadelphia Engineering Works, Ltd.,**  
Philadelphia, Pa., U. S. A.

Selling Agents:

New York, Wm. M. Power, 121 Liberty St.  
Chicago, Wm. F. Parish Machinery Co., Home Insurance Building.

Buffalo, Roscoe H. Aldrich, 42 Builders' Exchange.  
Rochester, W. J. Creelman, 818 Granite Building.  
Charlotte, N. C., Mecklenburg Iron Works.

## ESTIMATES GIVEN ON ALL HEAVY MACHINERY AND CASTINGS.

THE BEST EQUIPPED FOUNDRY AND MACHINE SHOP IN AMERICA FOR HEAVY WORK.

**THE WALKER MFG. CO.,**  
CLEVELAND, OHIO.

TENSILE } 56,000 to 64,000 lbs.  
STRAIN. }



CAPACITY. { Plates 1 inch thick to No. 12.  
30 feet long.  
70 inches wide.

**WM. McILVAIN & SONS,**

READING, PA.,

MANUFACTURERS OF

## IRON AND STEEL BOILER PLATES.

Locomotive, Fire Box, Flange, Shell,  
Tank Iron and Steel, including Plates for  
Bridges, Girders, Stacks, Pipe and Fire  
and Burglar-proof Safes.

**THE ALLENTOWN ROLLING MILLS,**

MANUFACTURERS OF

Pig Iron, Merchant Bar Iron, Rolled Shafting, Mine Rails, I-Beams, Tee Bars, Fish  
Plates, Bolts, Nuts and Spikes.

Transfer and Locomotive Turn Tables, Blast Furnace, Rolling Mill and Mining Machinery, Mining Pumps, Etc. Roll Trains, Shears, Punches, Iron Trucks, Etc. Builders of all classes of Machinery. Makers of Castings of all descriptions for Cable and Electric Railway.  
ALLENTOWN, PA.

## McCLURE & AMSLER, Engineers and Contractors,

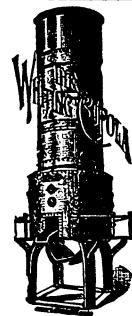
Bissel Block, Pittsburgh, Pa.

### Blast Furnace Construction

A SPECIALTY.

General Agents for Massick's and Crooke's Patent Fire Brick Stoves; Designs and Estimates for the construction of Blast Furnace Work, and for all kinds of Hot Blast Fire Brick or Pipe Stoves; and all other kinds of Brick Work pertaining to Steel Plants, Iron, Brick or Wooden Buildings, all kinds of Iron Construction in general.

We propose to put into successful operation all the plants we design and contract for.

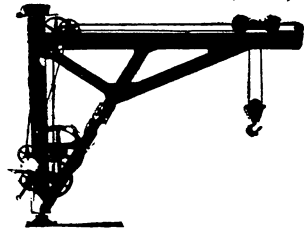


**Whiting Foundry Equipment Co.,**  
225 Dearborn St., Chicago,

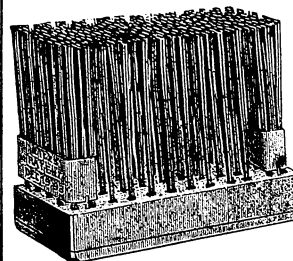
SUCCESSORS TO

**DETROIT FOUNDRY EQUIPMENT CO.**

**CRANES,  
CUPOLAS,  
LADLES,  
TUMBLERS, TRUCKS, &c., &c.**



### Rice's Pat. Casting Brush



will outwear  
three of any  
other kind.  
Our prices the  
lowest.

Send for Circular.

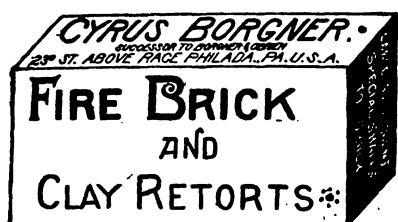
**THE RICE  
MFG. CO.,**  
New Durham,  
N. H.

**Wm. A. Harris  
Steam Engine Co.,**

BUILDERS OF

**Harris-Corliss Engines,**

PROVIDENCE, R. I.



ESTABLISHED 1856.

**HENRY MAURER & SON,**  
MANUFACTURERS OF  
**FIRE BRICK**  
of all Shapes and Sizes,  
420 E. 23d St., New York.

**B. KREISCHER & SONS,**  
**FIRE BRICK**

BEST AND CHEAPEST.

ESTABLISHED 1846.

Office, foot of Houston Street, East River, NEW YORK.

ESTABLISHED 1864.

**JAMES GARDNER & SON,**  
MANUFACTURERS OF

**"STANDARD SAVAGE" FIRE BRICK**  
**TILE and FURNACE BLOCKS**

OF ALL SHAPES AND SIZES.

WORKS, Ellerslie, Allegheny Co., Md.  
OFFICE, Cumberland, Md., P. O. Box 540.

S. M. Hamilton & Co., Agents, - Baltimore, Md  
Stowe, Fuller & Co., Agents, - Cleveland, O.

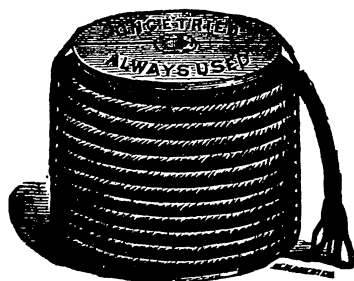
Established 1848.

**Ostrander Fire Brick Company**

Manufacture Fire Brick for all purposes.

Works at TROY, N. Y., and OSTRANDER, N. J.  
Main Office, TROY, N. Y., to which correspondence  
should be addressed.

Export Agent, J. W. D. Melghan, 111 Water St.,  
New York City.



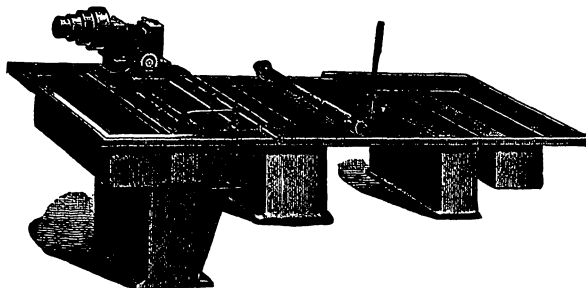
Send for a Sample of  
**Morrison's Patent Self-Lubricating Packing**  
**ROBT. MORRISON,**  
5034 Arsenal St., St. Louis, Mo.



**THE LLOYD BOOTH CO.,**

**YOUNGSTOWN,**  
**OHIO.**

**Tinning**  
**MACHINERY.**



**Rolling Mills,**  
**Sand and Chilli**  
**ROLLS.**

**GRAY IRON, BRASS, ALUMINUM and ALUMINUM BRONZE CASTINGS**  
of the very best quality.

Very much time saved by using clean and soft castings. We use only the best material. A trial  
will convince you. PICKETS and ROSETTES for Wire Workers. Catalogue of same.  
NICKEL PLATING and JAPANING, also METAL PATTERN MAKING and  
LIGHT MACHINE WORK. We invite correspondence.

**HAIGHT & CLARK, - - ALBANY, N. Y.**



**I. S. SPENCER'S SONS, Guilford, Conn.,**

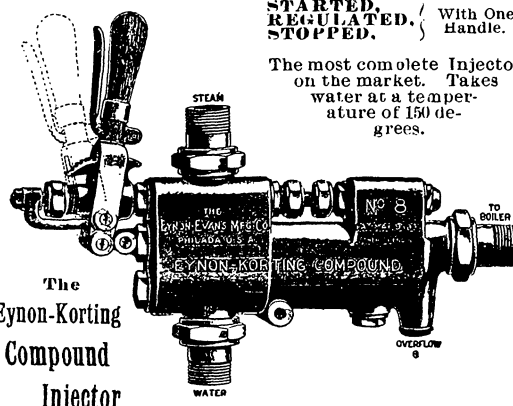
— MAKE TO ORDER —

**FINE GRAY IRON CASTINGS** OF BEST MATERIAL AND  
WORKMANSHIP.

**Sound and Smooth BRASS and BRONZE CASTINGS and HARDWARE.**

We have Machine Shop and Electro Plating Facilities.

SAMPLES SOLICITED FOR ESTIMATES.



**STARTED, REGULATED, STOPPED.** With One Handle.

The most complete Injector on the market. Takes water at a temperature of 150 degrees.

**The Eynon-Evans Mfg. Co.,**

**PHILADELPHIA, PA.**

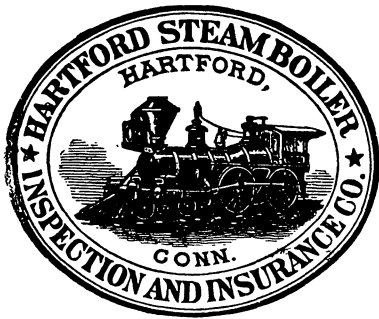
— MANUFACTURERS OF —

**Injectors, Condensers for Mine Pumps, Blowers for Boilers, Ventilators, Exhausters, Syphons, Valves, Etc.**

The most complete Brass Foundry in Pennsylvania. Capacity 7,000 pounds per Heat.

**WRITE FOR PRICES.**

Send for Valve and General Catalogues.



# THOROUGH INSPECTIONS

And Insurance against loss or damage to property and loss of life and injury to persons caused by

## Steam Boiler Explosions

J. M. ALLEN, Pres. WM. B. FRANKLIN, Vice-Pres. F. B. ALLEN, 2d Vice-Pres. J. B. PIERCE, Sec. and Treas.

### BOARD OF DIRECTORS:

J. M. ALLEN, President.  
FRANK W. CHENEY, of Cheney Brothers Silk Manufacturing Co.  
CHARLES M. BEACH, of Beach & Co.  
DANIEL PHILLIPS, of Adams Express Company.  
RICHARD W. H. JARVIS, President Colt's Fire Arms Manufacturing Co.  
LEVERETT BRAINARD, of the Case, Lockwood & Brainard Co.  
GEN. WM. B. FRANKLIN, late Vice-President Colt's Pat. Fire Arms Mfg. Co.  
NELSON HOLLISTER, of the State Bank, Hartford.

HON. HENRY C. ROBINSON, Attorney at Law, Hartford.  
HON. FRANCIS B. COOLEY, of the National Exchange Bank, Hartford, Conn.  
EDMUND A. STREADMAN, President of the Fidelity Co., Hartford, Conn.  
GEORGE BURNHAM, Baldwin Locomotive Works, Philadelphia.  
HON. NATHANIEL SHIPMAN, Judge U. S. Circuit Court.  
C. C. KIMBALL, Prest. Smythe Manufacturing Co., Hartford, Conn.  
PHILIP CORBIN, of P. & F. Corbin, New Britain, Conn.

## THE C. & C. ELECTRIC COMPANY,

—MANUFACTURERS OF—

### MULTIPOLAR DYNAMOS, DIRECT DRIVEN OR BELTED,

IN SIZES UP TO 250 H.-P.

Bipolar Dynamos up to 100 H.-P. Electric Motors, Automatic or Hand Controlled. Complete Plants for Power Transmission. Isolated Lighting Plants. Central Station Apparatus.

General Office, 143 Liberty St., New York. Works, Garwood, N. J., on Central R. R. of N. J.

BRANCH OFFICES: CHICAGO, Monadnock Building. BOSTON, 63 Oliver Street. CLEVELAND, Cuyahoga Building. PHILADELPHIA, 633 Arch Street.

# NICKEL

# PLATING

SEND FOR CATALOGUE OF  
NICKEL & ELECTRO-PLATING  
SUPPLIES & POLISHING MATERIALS.

ZUCKER & LEVETT  
& LOEB CO

8 TO 14 GRAND STREET,  
NEW YORK, U. S. A.

# OUTFITS.

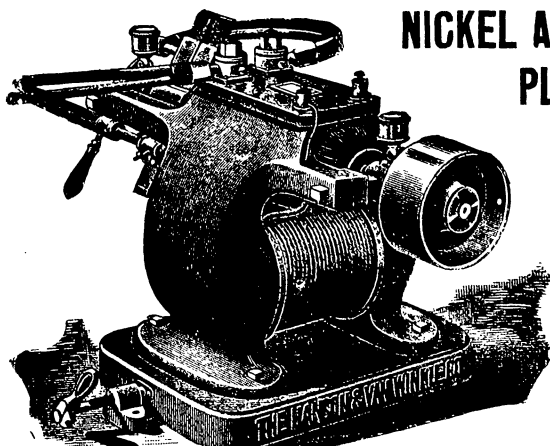
ESTABLISHED 1820.

INCORPORATED 1891.

## The Hanson & Van Winkle Co.,

MANUFACTURERS OF

### NICKEL AND ELECTRO PLATERS' MATERIAL.



**WE FURNISH EVERYTHING.**

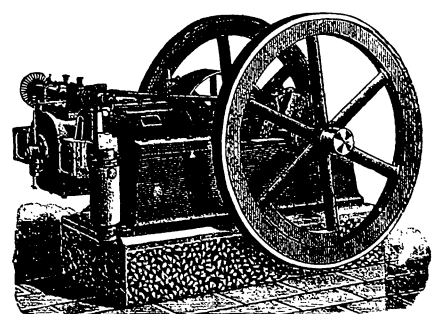
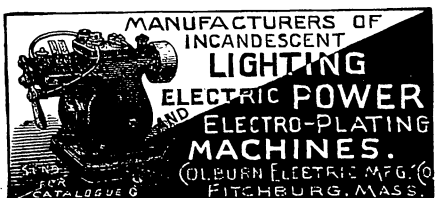
Nickel-Plating Outfits  
From \$20 upward.  
DYNAMO-ELECTRO MACHINES  
For all purposes.  
The New H. & V. W. Dynamo Machine.  
In sizes from No. 1 to No. 5.  
**FROM \$100 TO \$800.**

These machines will be placed on 30 days' trial with responsible parties, and if not satisfactory may be returned at our expense. Guaranteed 30% more powerful than any machine in the market at same price.

219-221 Market St., Newark, N. J.

81 Liberty St., New York.

35-37 South Canal St., Chicago, Ill.

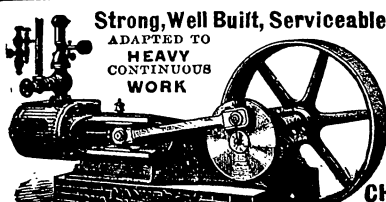


## Gas and Gasoline ENGINES,

Using Natural Gas, Coal Gas, Producer, Gas and Gasoline direct from the tank, 1 to 40 H. P., actual.

THE SPRINGFIELD GAS ENGINE CO.,

20 W. Washington St., Springfield, O.



Strong, Well Built, Serviceable  
ADAPTED TO  
HEAVY  
CONTINUOUS  
WORK

STEAM ENGINES SINGLE OR DOUBLE.  
BOILERS TUBULAR AND FIRE-BOX.  
CIRCULAR AND MULAY SAW MILLS

IN STOCK FOR IMMEDIATE DELIVERY.

FOR DESCRIPTIVE CATALOGUES ADDRESS  
CHANDLER & TAYLOR CO., INDIANAPOLIS, IND.

# BOOKS

—ON—

## Mechanical <sup>AND</sup> Steam Engineering.

### Engineers' Sketch Book.

By THOMAS WALTER BARBER, engineer.  
Nearly 200 illustrations, descriptive notes  
and memoranda; 243 pages; cloth..... \$3

### Locomotive Engine Running and Management.

A practical treatise on the locomotive engines, showing their performance in running different kinds of trains with economy and dispatch; also directions regarding the care, management and repairs of locomotives and all their connections. Illustrated by numerous engravings. Seventeenth edition  
By ANGUS SINCLAIR, M.E. Cloth..... \$2

### Stationary Steam Engines.

Especially adapted to electric lighting purposes. Treating of the development of steam engines—the principles of construction and economy, with description of moderate speed and high speed engines. By Prof. R. H. THURSTON. Fourth edition; 177 pages cloth..... \$1.50

### Complete Practical Machinist.

By JOSHUA ROSE. Embracing lathe work, vise work, drills and drilling, taps and dies, hardening and tempering, the making and use of tools, &c. Fifteenth edition; 356 illustrations; 430 pages..... \$2.50

### The American Steam Engineer.

Theoretical and practical, with examples of the latest and most approved American practice in the design and construction of steam engines and boilers of every description. For the use of engineers, machinists, boiler makers and students. By EMORY EDWARDS, M.E. Illustrated by 77 engravings; 419 pages; cloth..... \$2.50

### The New Catechism of the Locomotive.

Rewritten and enlarged with new matter and illustrations selected from the latest practice in this country. By M. N. FORNEY; 709 pages; cloth..... \$3.50

### Thermo-Dynamics, Heat Motors and Refrigerating Machines

By PROF. DE VOLSON WOOD. Third edition, revised and enlarged; 452 pages; cloth.... \$4

### Mechanics' and Engineers' Pocket Book.

By CHAS. H. HASWELL. Fifty-fifth edition; 956 pages; leather..... \$4

### Manager's Hand-Book of Modern Rules,

Tables and Data for Civil and Mechanical Engineers, Millwrights and Boiler Makers, Tool Makers, Machinists and Metal Worker's Iron and Brass Founders, &c. By W. S. HUTTON. Thick 8vo, half-bound..... \$6

### Valve Gears.

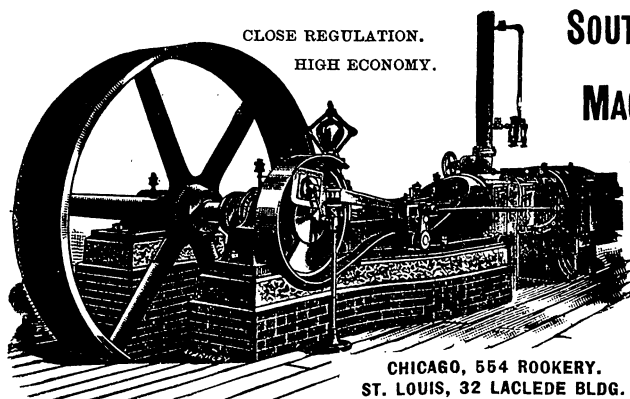
Analysis by Zeuner Diagram. By H. W. SPANGLER, P. A. Engr. U. S. Navy; 160 illustrations; cloth..... \$2.50

Sent, post-paid, on receipt of price by

**DAVID WILLIAMS,**

Publisher and Bookseller,

96-102 READE ST., - NEW YORK.



CLOSE REGULATION.  
HIGH ECONOMY.

**SOUTHWARK FOUNDRY**

—AND—

**MACHINE COMPANY,**

Philadelphia, Pa.

Sole Makers of

**THE PORTER-ALLEN  
AUTOMATIC ENGINE,**

SIMPLE, COMPOUND  
OR TRIPLE EXPANSION.

Also Builders of

**BLOWING ENGINES,  
REVERSING ENGINES,  
CENTRIFUGAL PUMPS,  
BOILERS, TANKS, ETC.**

CHICAGO, 554 ROOKERY.  
ST. LOUIS, 32 LACLEDE BLDG.

## HANDY GATE VALVES

**You have seen this before . .** But this is only to remind you that the "Handy" is still in the ring; more popular than ever, and the sale of same daily increasing.

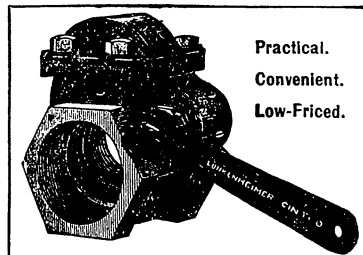
For low pressures (below 75 lbs.) the "Handy" is better adapted than any other on the market.

Have you our catalogue of numerous Steam Specialties?

Specify the "LUNKENHEIMER" make; all goods bear our name and are fully warranted.

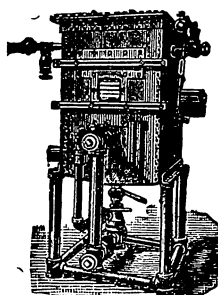
**The Lunkenheimer Company,**

CINCINNATI, O., U. S. A.



Practical.  
Convenient.  
Low-Priced.

FOR SALE BY DEALERS.



## WE NEVER SOLD ONE

of our Vacuum Feed Water Heaters and Purifiers until we had first satisfied our customer that it was capable of saving money for him. Our Catalogue will make this saving clear to you. Shall we mail it? We also build the Webster Separator and William's Vacuum System of Steam Heating.

**WARREN WEBSTER & Co.,**

NEW YORK, 126 Liberty Street.  
CHICAGO, Monadnock Building.

No. 8.

**CAMDEN, N. J.**

# STEAM

—IS RELIEVED OF—

## OIL AND WATER

By passing through Webster Separators.

SEND FOR COPY OF TESTS AND CATALOGUE TO

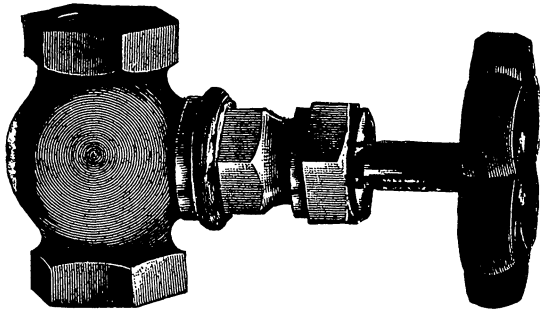
**WARREN WEBSTER & CO.,**

**Camden, N. J.**

**BLAST FURNACES,  
ROLLING MILLS,  
STEEL WORKS,  
MINES, ETC.,  
ETC.**



**OIL WELLS,  
REFINERIES,  
ELECTRIC LIGHT PLANTS,  
WATER WORKS, ETC.,  
ETC.**



**McNAB & HARLIN MFG. CO.,**

—MANUFACTURERS OF—

**BRASS COCKS AND VALVES**

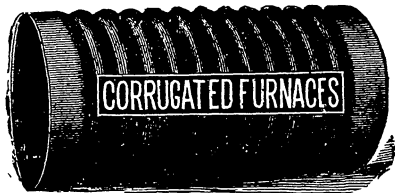
For Steam, Water and Gas.

Wrought Iron Pipe and Fittings. Plumbers' Materials. Seamless Brass and Copper Tubes.

Factory, PATERSON, N. J.

56 JOHN ST., N. Y.

Catalogue and Price-List will be sent to the Trade with their first order, or by express, if desired, before ordering.



**THE CONTINENTAL IRON WORKS**

West and Calyer Streets, BROOKLYN, N. Y.,

—SOLE MANUFACTURERS IN THE UNITED STATES OF—

**CORRUGATED FURNACES, FOR MARINE AND LAND BOILERS.**

Made in sizes from 28 in. to 60 in. diameter, with flanged or plain ends.

Thos. F. Rowland, Pres.  
Thos. F. Rowland, Jr., Treas.

Warren E. Hill,  
Chas. H. Corbett, } Vice-Pres.

Take Ferry from East 10th or 23d Streets, N. Y., to Greenpoint.

**Bass Foundry & Machine Wks.**

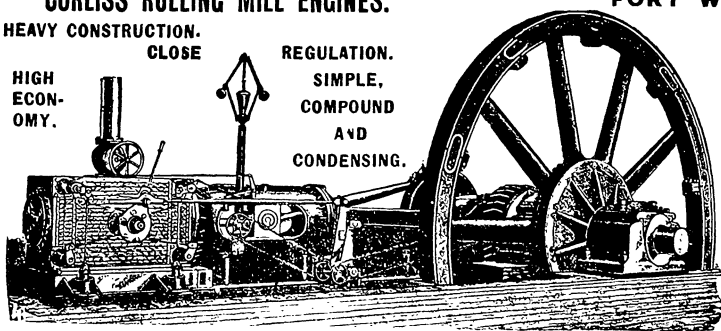
CORLISS ROLLING MILL ENGINES.

FORT WAYNE,  
IND.

HEAVY CONSTRUCTION.  
CLOSE

HIGH  
ECON-  
OMY.

REGULATION.  
SIMPLE,  
COMPOUND  
AND  
CONDENSING.



Boilers  
and  
Complete  
Steam  
Outfits.

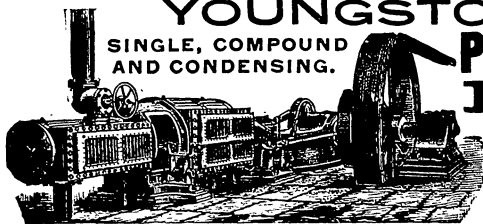
**WILLIAM TOD & CO.**

YOUNGSTOWN, OHIO.

SINGLE, COMPOUND  
AND CONDENSING.

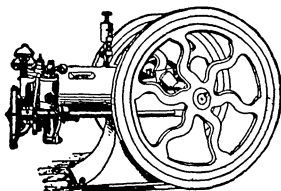
**PORTER-HAMILTON  
ENGINE**

Blowing Engines,  
Hydraulic Cranes & Accumulators  
Heavy Special Machinery.  
ENGINE CATALOGUE ON APPLICATION.



**The "Lambert" Gas and Gasoline Engines.**

POWER from natural gas,  
coal gas and gasoline di-  
rect from tank. 1 to 50 H.-P.  
stationary; 6 to 20 H.-P. port-  
able. Reliable power for less  
than 1 cent per hour per H.-P.  
No boiler, no fire, no steam, no



engineer, no dirt and perfectly  
safe. Suitable for running all  
kinds of manufacturing plants,  
electric light plants and for all  
purposes where reliable power  
is required. Write for descrip-  
tion and prices

THE BUCKEYE MFG. CO., 50, 51, 52 and 53 Division St.,

UNION CITY, IND.

**OIL**

AND

**WATER**

EASILY AND COMPLETELY RE-  
MOVED FROM

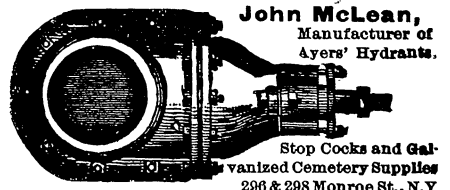
**STEAM**

BY OUR

**Cochrane Separators**  
FOR HORIZONTAL OR VERTICAL  
PIPES.

FOR PARTICULARS ADDRESS

Harrison Safety Boiler Wks.,  
Germantown Junction. PHILADELPHIA, PA.



John McLean,  
Manufacturer of  
Ayers' Hydrants.

Stop Cocks and Gal-  
vanized Cemetery Supplies  
296 & 298 Monroe St., N.Y.



Every style large or small. (See Catalogue).  
BOSTON GEAR WORKS, 37 Hartford St., Boston, Mass.



# BOOKS

—ON—

## Mechanical and Steam Engineering.

### The Slide Valve Practically explained.

Embracing simple and complete practical demonstrations of the operation of each element in a slide-valve movement, and illustrating the effects of variations in their proportions by examples carefully selected from the most recent and successful practice. By JOSHUA ROSE, M. E. Illustrated by 38 engravings; 100 pages; cloth.....\$1

### Twenty Years with the Indicator.

Being a practical text book for the engineer or the student, with no complex formulae. By THOMAS PRAY, JR., consulting, constructing, civil and mechanical engineer, &c. Newly arranged; complete in one volume; 284 pages; cloth.....\$2.50

### A Treatise on Belts and Pulleys

Embracing full explanations on fundamental principles, proper disposition of pulleys, rules for determining widths of leather and vulcanized rubber belts and belts running over covered pulleys; strength and proportions of pulleys, drums, &c.; together with the principles and necessary rules for rope gearing and transmission of power by means of metallic cables. By J. HOWARD CROMWELL, Ph. B., author of a Treatise on Toothed Gearing; 271 pages; cloth...\$1.50

### Modern Steam Engines.

An elementary treatise upon the steam engine, written in plain language, for use in the workshop, as well as in the drawing office, giving full explanations of the construction of modern steam engines, including diagrams, showing their actual operation; together with complete but simple explanations of the operations of various kinds of valves, valve motions and link motions, &c., thereby enabling the ordinary engineer to clearly understand the principles involved in their construction and use, and to plot out their movements upon the drawing board. By JOSHUA ROSE, M. E. Illustrated by 423 engravings; 321 pages, 10 x 12 inches; cloth.....\$6

### Richards' Steam Engine Indicator.

A treatise on the development and application of force in the steam engine. Fourth edition, revised and enlarged. By C. T. PORTER. 273 pages; 20 plates; cloth.....\$3

### A Manual of Steam Boilers,

their designs, construction and operation for technical schools and engineers. By PROF. R. H. THURSTON. Second edition; 183 engravings in text; 671 pages; cloth..\$5

### The English and American Mechanic.

An every-day handbook for the workshop and factory, containing several thousand receipts, rules and tables indispensable to the mechanic, the artisan and the manufacturer. By B. FRANK VAN CLEEVE. A new enlarged edition by EMORY EDWARDS, M. E. 476 pages illustrated; cloth .....\$2

Any Book published sent, post-paid, upon receipt of price, by

## DAVID WILLIAMS,

Publisher and Bookseller,

96 - 102 Reade St., New York.

## The Edward P. Allis Company,

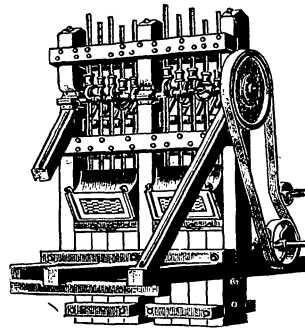
MILWAUKEE, WIS.,

MANUFACTURERS OF

BLOWING ENGINES,  
HOISTING ENGINES,  
PUMPING ENGINES,  
AIR COMPRESSORS,  
SPECIAL ENGINES

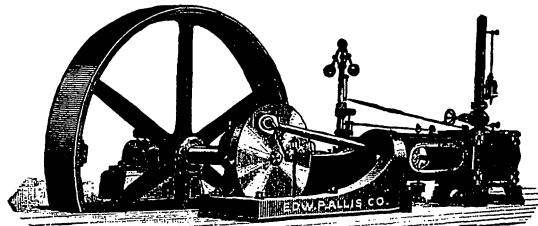
FOR

ELECTRIC LIGHTS,  
STREET RAILWAYS  
AND  
ROLLING MILLS,



ORE CRUSHERS,  
CRUSHING ROLLS,  
STAMP MILLS,  
CONCENTRATORS,  
GENERAL MINING,  
MILLING AND  
SMELTING  
MACHINERY.

REYNOLDS'  
PATENT  
VERTICAL  
BOILERS.



REYNOLDS'  
CORLISS  
ENGINES.

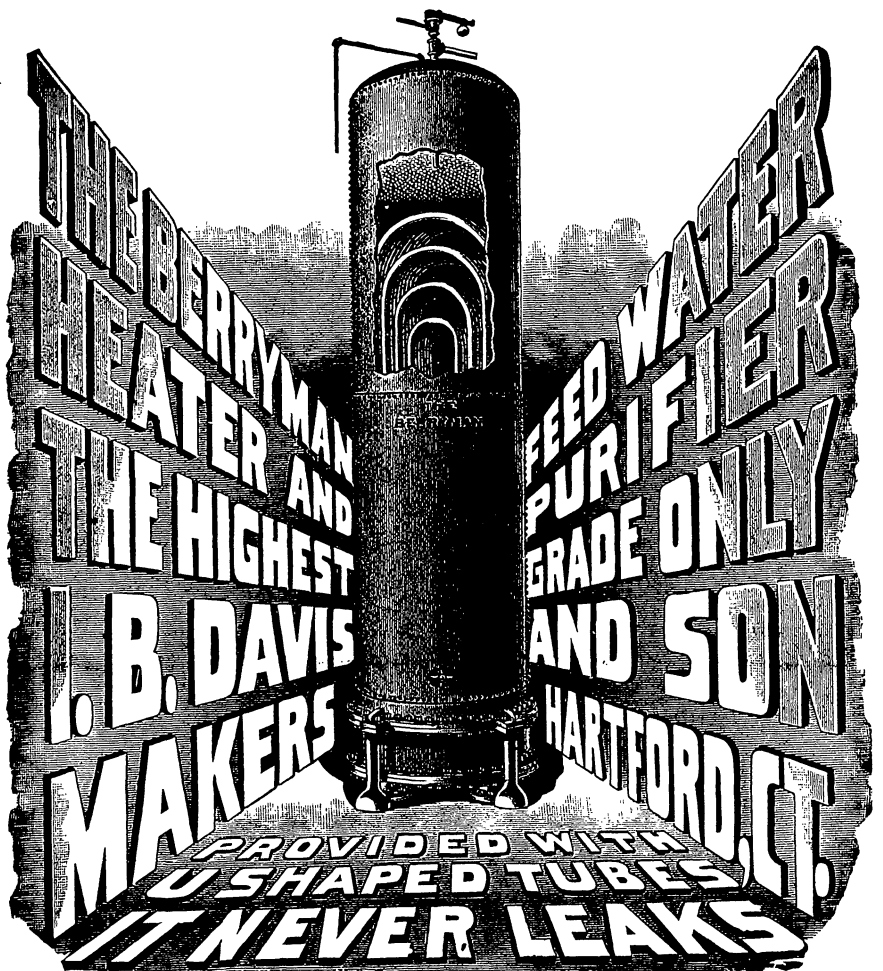
NEW YORK:  
26 Cortlandt St., Room 1111,  
F. A. Larkin, Mgr.

MINNEAPOLIS:  
416 Corn Exchange, J. F. Harrison, Mgr.

CHICAGO:  
509 Home Ins. Building,  
J. B. Allan, Mgr.

SAN FRANCISCO:  
31 Main St.,  
D. B. Hanson, Mgr.

DENVER:  
1316 18th St., W. H. Emanuel, Agt.

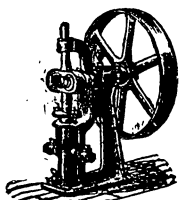


SEND FOR CATALOGUE A

## POWER BOILER FEED PUMPS

in 9 sizes, for from 2 to 100 H.-P. Boilers. The large sizes are geared, all self-contained, very strong built with large bearings and are both durable and reliable. They handle hot water from heater. Special heavy brass valves. Send for catalogue and prices.

C. O. LUCAS & CO., 38 E. Front St. Greenville, Ohio.

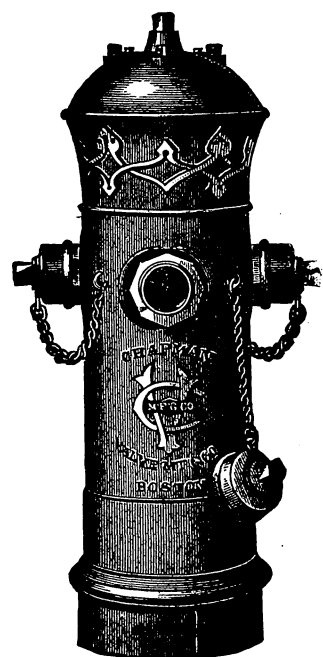
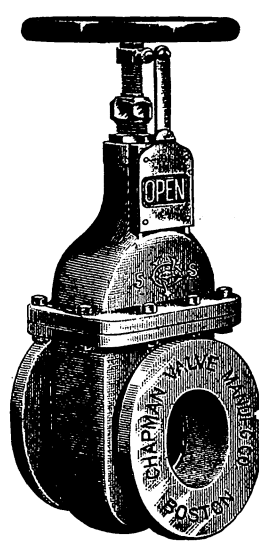
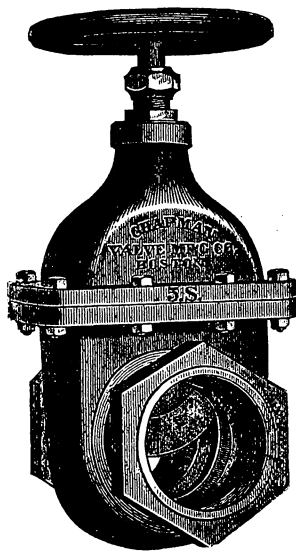
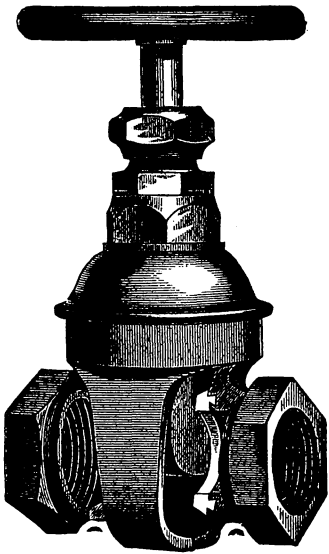




# Chapman Valve Manufacturing Company,

MANUFACTURERS OF

Valves and Gates for Steam, Water, Gas, Ammonia.



## GATE FIRE HYDRANTS,

*With and Without Independent Nozzle Valves.*

Valves and Hydrants made with Babbitt Metal Seats and non-corrosive working parts. **All Work Guaranteed.** Send for Price-List

The GENUINE CHAPMAN VALVES in all cases will bear our name in full, either rolled in or cast upon the shell, and also our Trade Mark and Monogram.

We make a Specialty of Valves for Superheated and High-Pressure Steam, 125 lbs. Pressure and Upwards.

WORKS AND GENERAL OFFICE:

TREASURER'S OFFICE:

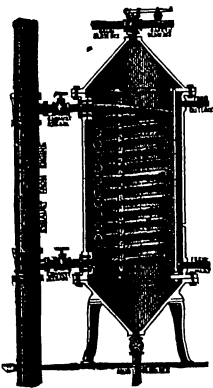
INDIAN ORCHARD, MASS.

72 Kilby and 112 Milk St., Boston, Mass.

Chicago Office, 24 West Lake Street.

New York Office, 28 Platt Street.

L. M. RUMSEY MFG. CO., St. Louis, Mo., Southwestern Agents.



## THE AMERICAN FEED WATER HEATER

Received the First Prize at the

Mechanics' Association Fair, - Boston, Mass.

What you get when you buy the AMERICAN HEATERS:

COPPER COILS,  
SOLIDLY BRAZED,  
GUN METAL FITTINGS  
AND CLAMP STAYS,  
STEEL SHELLS,

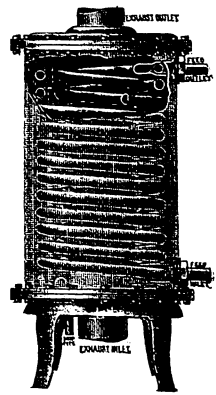
NO RUSTING OUT,  
NO LEAKY JOINTS,  
NO TROUBLE FROM EXPANSION,  
NO BACK PRESSURE,  
NO OIL IN BOILER.

We guarantee this Heater to be the Most Durable, Effective and Cheapest

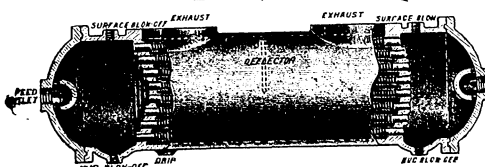
**WHITLOCK COIL PIPE CO.,**

27 South Street,

Elmwood, Conn.



## WAINWRIGHT HEATERS.



This cut illustrates the **HORIZONTAL TYPE** of our **WATER TUBE HEATERS**. Our catalogue contains full information regarding several other styles of Heaters also information in regard to Surface Condensers and Expansion Joints. All of these appliances contain corrugated copper tubing. We shall be glad to correspond with you.

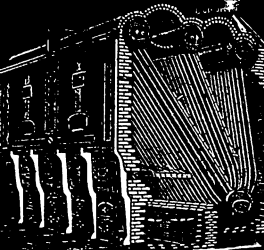
**THE TAUNTON (MASS.,) LOCOMOTIVE MFG. CO.**

H. S. Walker, 26 W. Randolph St., Chicago, Ill.

W. C. Brown, 68 Cortlandt St., New York, N. Y.

The Rowell &amp; Chase Machinery Co., 1217 Union Ave., Kansas City, Mo.

SAFE. EFFICIENT.  
ECONOMICAL.  
DURABLE.  
PRACTICALLY  
SELF-CLEANING.  
NO CAST METAL.



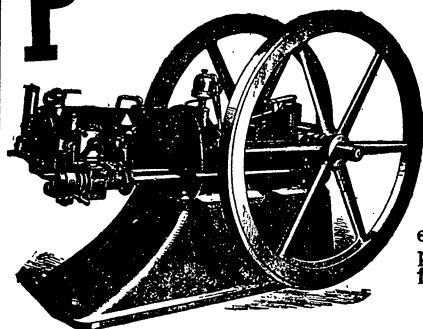
NO FLAT SURFACES.  
NO STAY BOLTS.  
REMOVAL OF FOUR  
MANHOLE PLATES  
GIVES ACCESS TO  
EVERY PART.

# THE STIRLING WATER TUBE SAFETY BOILER.

74 Cortlandt St., New York.  
418 Walnut St., Phila.  
Cuyahoga Building, Cleveland.

**THE STIRLING CO.,**  
Gen'l Offices, Pullman Building,  
CHICAGO, ILL.

## POWER FROM GASOLINE.



33d and Walnut Sts., PHILADELPHIA, PA.

DIRECT FROM THE TANK.  
CHEAPER THAN STEAM. No Boiler. No Steam. No Engineer.

FOR USE EVERYWHERE.

### OTTO GASOLINE ENGINES,

STATIONARY, 1 to 120 H. P., or PORTABLE, 18 to 25 H. P.

Running Expenses, Less than one cent per horse power per hour. For large engines, one-half cent per horse power per hour. Suitable for all manufacturing purposes, Electric Lighting, Town Water Supply. The Best Auxillary Power for Night Work.

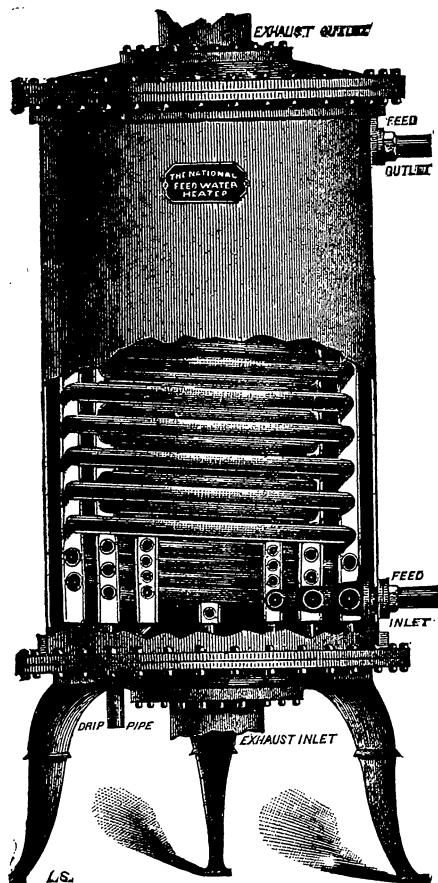
THE OTTO GAS ENGINE WORKS (Incorporated),

CHICAGO OFFICE: 245 Lake St.

BOSTON OFFICE: 19 Pearl St.

## The National Feed-Water Heater,

Delivering Water to the Boiler at 210° to 212°.



Over 400,000 Horse-Power in Use, and Satisfaction Universal.

18 Sizes Manufactured.

From 8 to 2000 Horse-Power.

Prices Low and Every Heater Guaranteed

Catalogue with list of users furnished on application.

ALSO MAKERS OF

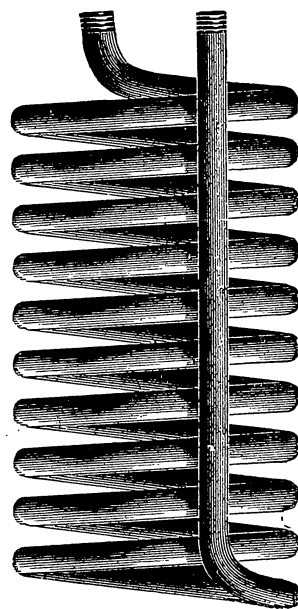
Coils and Bends of Iron,

BRASS AND COPPER PIPE.

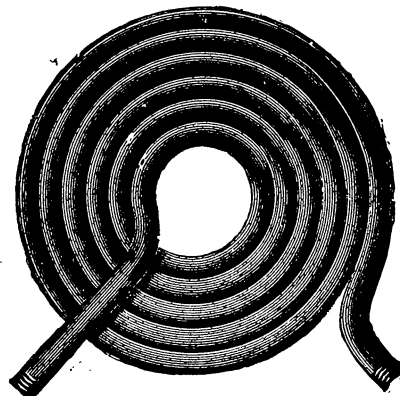
—ALL STYLES.—

THE NATIONAL PIPE BENDING CO.,

98 River St., New Haven, Conn.



SPIRAL COIL.



FLAT COIL—CLOSE.

## METAL PLATE WORK, Its Patterns and Their Geometry.

Also notes on metals and rules in mensuration for the use of tin, iron and zinc plate workers, &c.

By C. T. MILLIS. Second edition, revised and enlarged. 377 pages, 314 illustrations.

12mo, Cloth. . . . . \$3.50.

Sent, postpaid upon receipt of price by DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade St., N. Y.

Awarded the Grand Prize at Late Paris Exposition.

SEND FOR THIS BOOK  
FREE ON APPLICATION.

**BABCOCK & WILCOX CO.** WATER TUBE  
30 CORTLANDT ST. N.Y.

MANUFACTURERS OF STEAM BOILERS

OFFICES:  
BOSTON, MASS. 8 OLIVER ST.  
PHILADELPHIA, PA. 32 N. 5TH ST.  
PITTSBURGH, PA. 408 LEWIS BLOCK  
CLEVELAND, O. 412 PERRY-PAYNE BLDG.  
CHICAGO, ILL. 45 S. JEFFERSON ST.  
MINNEAPOLIS, MINN. 604 CORN EX.  
NEW ORLEANS, LA. 57 CAROLLETT ST.  
HAWANA, CUBA. 116 CALLE DELA HIENA

MANUFACTORIES IN UNITED STATES, SCOTLAND, FRANCE, GERMANY & AUSTRIA.

**R. POOLE & SON CO.**  
ENGINEERS, FOUNDERS and MACHINISTS.  
BALTIMORE, MD.

MANUFACTURERS AND DESIGNERS OF ALL KINDS OF  
**HEAVY MACHINERY,**  
REQUIRING FIRST CLASS WORKMANSHIP AND MATERIALS.

BAND, ROPE and FLY WHEELS, FRICTION CLUTCHES, SHAFTING, PULLEYS and HANGERS.

**MACHINE MOLDED AND PLANED GEARING.**

MACHINERY for WHITE LEAD and FERTILIZER WORKS,  
GRAIN ELEVATORS and FLOUR MILLS, BRASS, COPPER  
and TIN PLATE ROLLING MILLS, CABLE and MARINE RAILWAYS.  
POOLE-LEFFEL TURBINE WATER WHEELS.  
DREDGING MACHINES.  
CIRCULARS ON APPLICATION.  
IRON CASTINGS of 30,000 LBS. TENSILE STRENGTH.

## JUST ISSUED. USES OF COMPRESSED AIR,

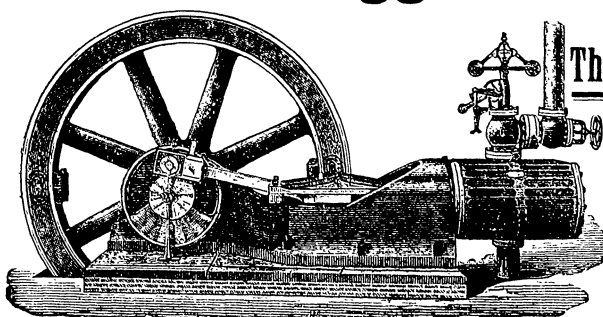
By ADDISON C. RAND.

134 PAGES, 94 ILLUSTRATIONS, PRINCIPALLY FROM ORIGINAL PHOTOGRAPHS AND DRAWINGS.

This handy volume is the only comprehensive work upon the uses of compressed air; it is accurate, readably written and beautifully printed upon heavy plate paper. Price \$1.00, postage paid. Order of the publishers,

**THE REPUBLIC PRESS, 14 Lafayette Place, N. Y.,**  
The Van Nostrand Co., G. P. Putnam's Sons, of N. Y., Damrell, Upham & Co. (the old Corner Book Store), Boston, Mass., Robt. Clarke & Co., Cincinnati, Ohio, The American News Co., and any bookseller.

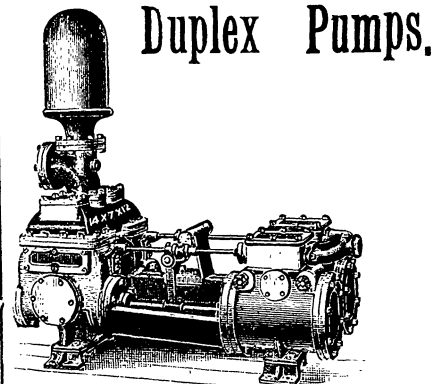
## Totten & Hogg I. & S. F'dry Co.,



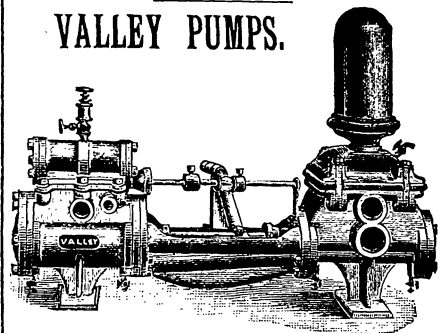
Manufacturers of  
The "Aetna" Rolling Mill

### ENGINE

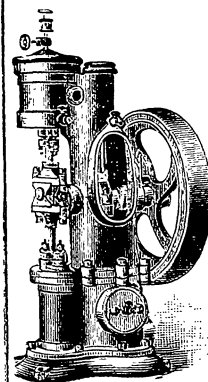
Chilled and Sand  
Rolls and Rolling Mill  
Machinery,  
PITTSBURGH, PA.



Duplex Pumps.

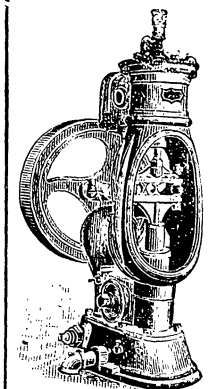


VALLEY PUMPS.



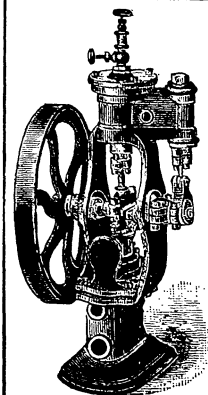
ACME  
Steam Pumps

For Feeding Boilers or  
forcing water against  
heavy pressure.



BUCKET  
PLUNGER

Steam Pumps for feed-  
ing Boilers, filling  
Tanks, or Fire  
purposes.

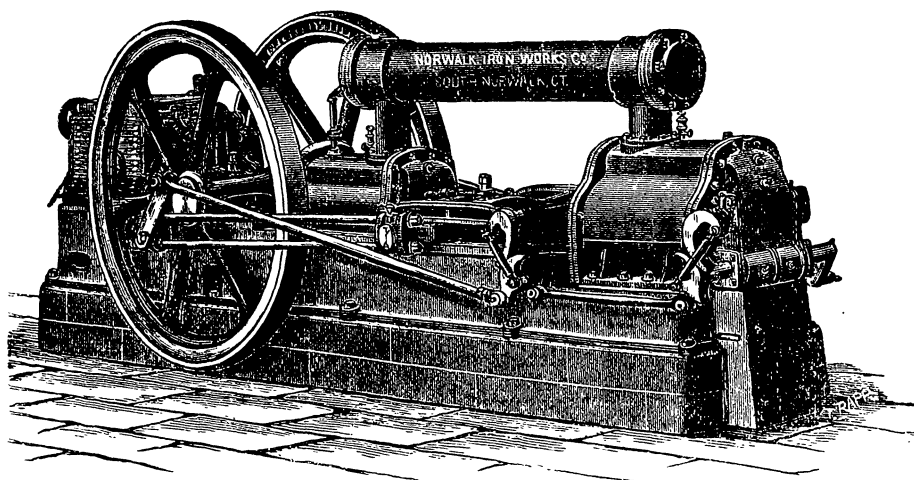


A. B. C.  
Steam Pumps

The best low price  
pump in the  
world.

**VALLEY PUMP WKS.**  
EASTHAMPTON, MASS.  
Chicago Agency: 15 So. Canal St.

# Air Compressors.



**THE NORWALK IRON WORKS CO., South Norwalk, Conn.**



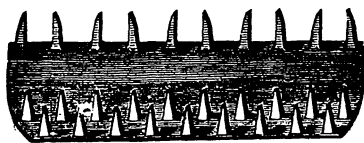
**CHEAPEST.  
HANDIEST.  
SIMPLEST.**

Handling Dirty, Gritty and Sandy Liquids, without Wear, Oil or Care. Pumping outfits for Contractors, Mining, Irrigating, Railroad, Quarry, Drainage and Manufacturing purposes. Second-hand Engines, Boilers, Pumps, and other Machinery always on hand. Exchanging.

**MASLINS, 165-167 First St., Jersey City, N.J.**

**PUMPS.**

**Talcott's Combination Belt Hooks.**



**W. O. TALCOTT, Providence, R. I.**  
MANUFACTURER OF

Four Styles of BELT HOOKS, Including 134 Sizes.  
**SEND FOR CATALOGUE.**

**THE DURANT COUNTING MACHINES**

Received the Highest Award at the World's Fair.



Send for Catalogue to  
**W. N. DURANT, 234 22d St., Milwaukee, Wis.**  
English Agent, **FRED'K ULLMER, Cross St., Farrington Road, London, E. C.**

**EXPERIMENTAL ELECTRICITY.**

By **EDWARD TREVERT.**

Illustrated. - Cloth. - \$1.00.

**CONTENTS**—Some Easy Experiments in Electricity and Magnetism; How to Make Electric Batteries; A Galvanometer; An Induction Coil; An Electric Bell; A Magneto Machine; A Telegraph Instrument; An Electric Motor; A Dynamo; Electric Bell Fitting and Gas Lighting; Electric Lamps; Electric Terms.

Sent, post-paid on receipt of price by

**DAVID WILLIAMS,**

Publisher and Bookseller,

**96-102 Reade St., New York.**

**DEAN BROTHERS'**

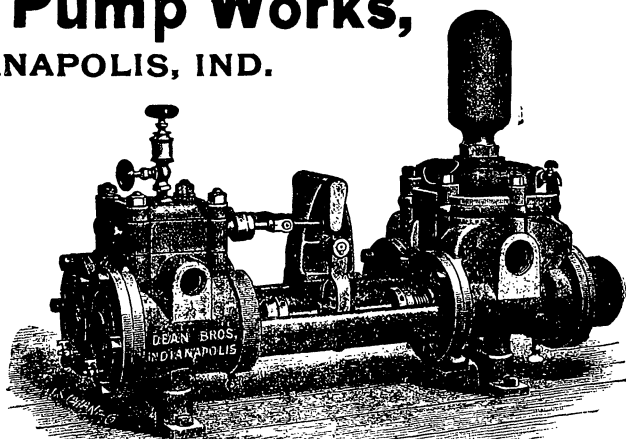
**Steam Pump Works,**

**INDIANAPOLIS, IND.**

**DUPLEX PUMPS.**

**SINGLE PUMPS.**

**DEEP WELL PUMPS.**



Send for Catalogue  
and Prices.

**The JOHN H. MCGOWAN CO.**

RIVAL STEAM PUMP, TWIN LEVER DUPLEX, 1893 BLADE FEEDER, TRIPLEX, DEEP WELL PUMP.

**PUMPS FOR EVERY SERVICE** **CINCINNATI, OHIO.** **PRICE LIST ON APPLICATION**

Factory Office 46 CENTRAL AVE.

Brass founders and Mfrs. of every description of Brass and Iron body goods for steam, gas and water.

BRANCH HOUSE: 1425 E. Main St., Richmond, Va.

**Worthington Steam Pumps**  
**CONDENSERS and WATER METERS.**

**HENRY R. WORTHINGTON,**

**NEW YORK, 86 & 88 LIBERTY STREET.**

Boston, 70 Kilby St.

Philadelphia, 607 Arch St.

Cleveland, 24 South Water St.

Chicago, 185 to 189 Van Buren St.

St. Louis, Eighth and St. Charles Sts.

**The WATERBURY-FARREL FOUNDRY & MACHINE CO., Waterbury, Connecticut,**

Builders of Rolling Mill Machinery, Special Machines for finishing and making goods from sheet Brass, Copper, Steel, Silver, &c., **POWER PRESSES, HYDRAULIC PRESSES,** Drop Presses, Foot Presses, **RIVET MACHINES,** Gang Slitters, Grinding Machines, Steel Rolls, Wire Mill Machinery, Tube Drawing Machinery, Dies, &c.

# The Brown Hoisting & Conveying Machine Co.,

CLEVELAND, OHIO, U. S. A.

## Complete Systems for Handling of Materials.

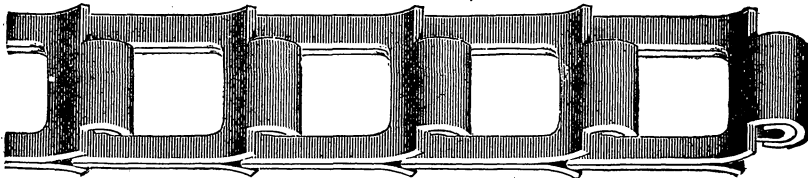
THE BROWN PATENT Bridge Tramway. Shed Tramway. Sewer Machinery Tramway.  
Cable Tramway Warehouse Tramway. Automatic Furnace Hoist.

Traveling Crane for Shipbuilders, a perfect appliance for handling Frames, Armor Plates, etc. The Brown Patent Cantilever Derricks, in use on the Chicago Main Drainage Canal. Working Capacity of Cantilever 500 to 700 yards "solid rock in place" per day of 10 hours. The Brown Patent Friction Clutch Hoisting Engine.

Self-Dumping Buckets, Skip Cars. Friction Clutches, etc.

## ROBERTS MANUFACTURING CO.,

2100 Smallman Street, PITTSBURGH, PA.



— MANUFACTURERS OF —

Patent Detachable Steel Link Belting, Sprocket Wheels and Shafting, also Malleable Wrought Steel Cable and Special Chains, Elevating, Conveying and Mining Machinery, Wire Rope Haulages and Tramways.

SEND FOR CATALOGUE.

**JEFFREY**

Roller, Steel Drag, Cable and Special Chains.  
FOR  
**ELEVATING  
AND  
CONVEYING  
MACHINERY**  
FOR HANDLING MATERIAL OF ALL KINDS.  
Power Transmission Machinery.  
WIRE CABLE CONVEYORS.  
For long & short distance Conveying.  
**THE JEFFREY MFG. CO.** 163 Washington St., N. Y.  
Columbus, Ohio. Send for Catalogue.

## FITCHBURG MACHINE WORKS,

MANUFACTURERS OF THE CELEBRATED

**FITCHBURG** **ENGINE LATHE**

AND OTHER

METAL-WORKING MACHINES.

SEND FOR CATALOGUE B.

48-inch Engine Lathe.

**FITCHBURG,  
MASS.**

**BUFFALO AUTOMATIC INJECTOR**  
A GRADING INJECTOR.

Operated entirely by one handle.  
Construction and operation is such that water supply is always in proportion to supply of steam admitted and can be graded to feed continuously with steam from 20 to 140 pounds. Works perfectly whether lifting or taking supply from city pressure. Operated entirely by one handle, both in stopping and starting and grading supply of steam and water.  
No Valves in either steam or suction pipes.  
EAGLE EJECTORS, DUPLEX FLUE SCRAPPERS, FETTHOUSE GAUGE COCKS, IMPROVED GLASS OIL CUPS AND LUBRICATORS, CYLINDER OIL PUMPS, COMPRESSION GREASE CUPS, Etc. Send for Catalogue. Mention this Paper.  
**SHERWOOD MFG. CO., Buffalo, N. Y.**  
EUROPEAN AGENTS, Green & Boulding, 21 Featherstone St., London, E. C.

FOR THE  
"Double Triple Quick Stroke"  
**SHAPER**

WRITE TO  
**GOULD & EBERHARDT, Newark, N.J.**



## GOULDS PUMPS Are Better For Spraying



The necessity and benefits of Spraying fruit trees, grape vines, &c., &c., are so generally recognized to-day that no hardware or agricultural stock is complete without Spray Pumps. We have Stationary, Portable and Knapsack Pumps and Special Spray Nozzles to meet every requirement. Can furnish everything ready for use. Send for special Spray Pump Catalogue.

### THE GOULDS MANUFACTURING CO.,

Manufacturers of PUMPS and HYDRAULIC MACHINERY,  
Works & Main Offices: Seneca Falls, N. Y., U. S. A. Warehouses: 16 Murray St., New York City.  
Or Nearest Branch Agency—THE GOULD CO., 23 and 24 North Canal St., Chicago, Ill.  
SMITH & WINCHESTER CO., 19 to 37 Wendell St., Boston, Mass. WOODIN & LITTLE, 812 & 814 Market St., San Francisco, Cal.  
N. O. NELSON MFG. CO., Eighth & St. Charles Streets, St. Louis, Mo. L. M. BATES, 321 Vine Street, Philadelphia, Pa.

FOR TESTING IRON  
AND STEEL SPECI-  
MENS, CAR COUPLERS,  
BRAKE SHOES, CHAIN,  
SPRINGS, WIRE, CE-  
MENT.

## RIEHLE TESTING MACHINES,

Hydraulic Pumps and  
Presses, Roble Jacks,  
Marble Machinery. Iron  
Founders & Machinists.  
**Riehle Bros. Testing  
Machine Co.,**  
9th St. abv. Master Phila

## LEVIATHAN BELTING.



Positively unequalled for Strength, Durability and Traction Power; unaffected by Heat, Steam or Water.

Belts for Main Driving and work of a heavy nature a specialty.

### MAIN BELTING COMPANY,

Sole Manufacturers,  
1219-1235 Carpenter St.  
PHILADELPHIA.

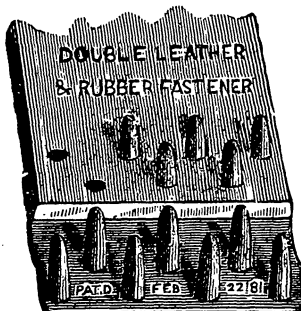
248 Randolph Street, Chicago.  
120 Pearl Street, Boston

Send for Price-Lists and Samples.

## ALEXANDER BROS. BEST OAK BELTING. PHILADELPHIA.

Patterson, Gottfried & Hunter, Limited, agents,  
148-150 Centre St., New York, N. Y.

Thacher's Patent BELT FASTENERS.



Manufactured by The Claffen Manufacturing Co.  
Cleveland, O. Office, 71 and 73 Ontario St.

## A WORD ABOUT

# "EX EX" (Trade Mark), No. 604.

We have made the "Ex Ex" brand of facings for eighteen years, and it is considered by many to be absolutely without an equal.

The well-known Press Manufacturers, R. Hoe & Co. and T. Schriver & Co., New York, have been large users of it for fifteen years. Steinway & Sons, New York, have also been users of "Ex Ex" Facing for the same length of time. The Niles Tool Works, Hamilton, Ohio, have used it for eight years, and buy in 20-barrel lots. The Philadelphia and Reading R. R. buy 10 barrels at a time, and have used it for the past eight years. The Dickson Manufacturing Co., Scranton, Pa., have been steady users of it for eight years. Davenport & Treacy Co., Stamford, Conn., Bridgeport Brass Co., Bridgeport, Conn., and the Knowles Steam Pump Works, Warren, Mass., have all used it from six to eight years.

The "Ex Ex" can be used both as a wash on dry sand work, or on green sand work, by dusting on a little powdered charcoal.

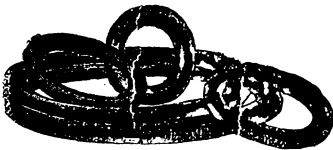
If the "Ex Ex" is desired on green sand work as a "One-Bag Facing," specify so in your order, and we will make it so by putting in the charcoal here.

For prices and samples address

## JOS. DIXON CRUCIBLE CO.,

JERSEY CITY, N. J.

## RUBBER GOODS



MOULDED

Small moulded work a specialty.  
Send for estimates for moulds and work.

FOR MECHANICAL PURPOSES.

H. O. CANFIELD, Bridgeport, Conn.

## PITTSBURGH MFG. CO.,

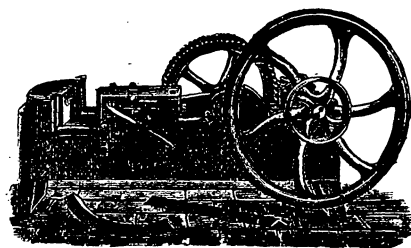
Manufacturers of

Crosgrove's Patent Straightening, Bending and Punching Machines.

NAIL MACHINERY.

Bolts, Nuts, Rivets, Castings, &c.

PITTSBURGH, - - PA.

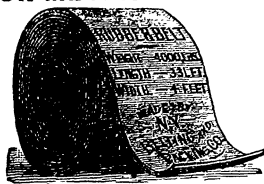


# NEW YORK BELTING & PACKING CO. LTD

OLDEST, LARGEST and BEST Makers of

## Rubber Goods

FOR MECHANICAL USES.



Rubber belting, hose, steam hose, brewer's hose, suction hose, "Test" fire hose, cotton hose, packing, valves, gaskets, rings, vulcanite emery wheels, rubber covered rolls, tubing, rubber cement, mats, matting, stair treads, bicycle and vehicle tires, car springs, fruit jar rings, etc. Special goods to order.



GOOD.



BETTER.

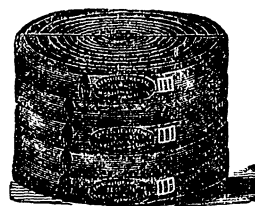


BEST.

Send for Catalogue.

## PIONEERS AND LEADERS.

15 Park Row, New York.



STORES: Boston, Philadelphia, Chicago, Cincinnati, Minneapolis, Cleveland, San Francisco, Detroit, Baltimore, Charleston, New Orleans, Kansas City, St. Louis, Dallas.

AGENTS WANTED IN UNOCCUPIED TERRITORY.



# E. W. BLISS CO.,

CHICAGO OFFICE, 100-104 W. WASHINGTON STREET.

## DOUBLE SEAMING MACHINE, No. 4.

THIS MACHINE is used for double seaming square, oval and irregular shaped work, such as wash boilers, foot tubs, dinner buckets, canisters, biscuit tins, fancy boxes, and other articles having round corners. Round work may also be done on these machines, but not as rapidly as on the ordinary round double seaming machines.

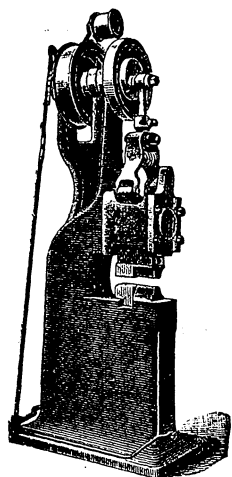
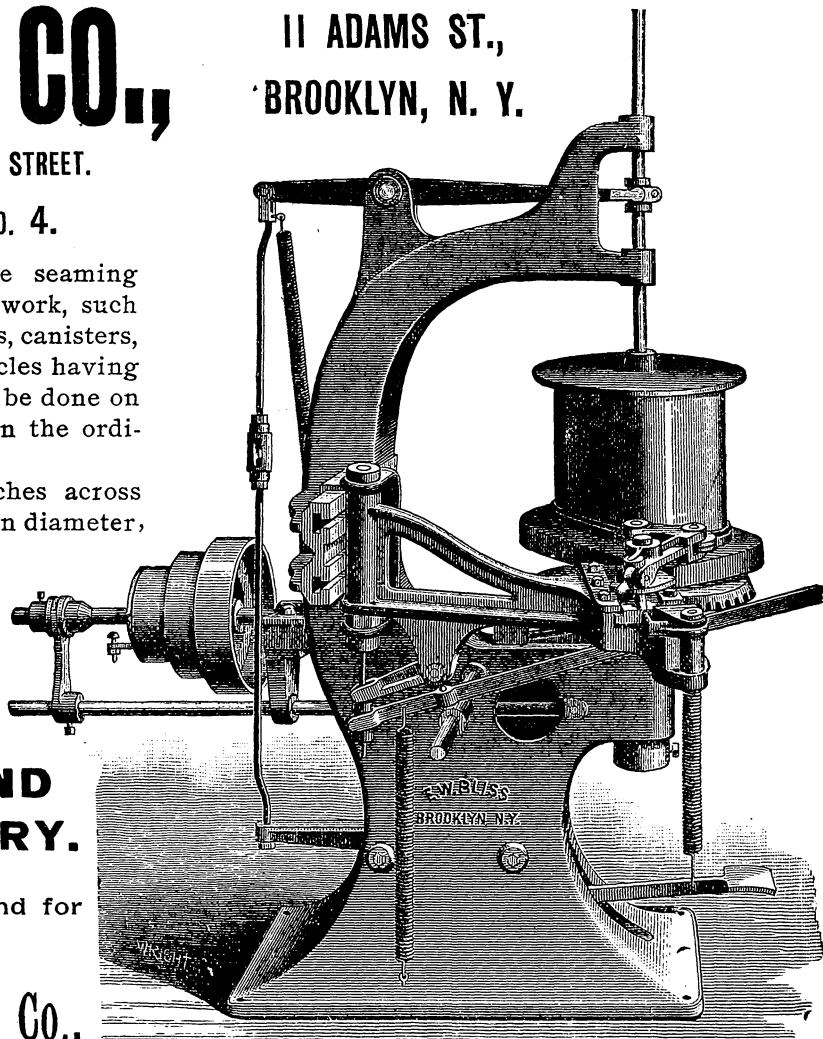
It will take work from 2 to 36 inches across corners, or round work up to 40 inches in diameter, and not exceeding 18 inches in height.

**PRESSES,  
PUNCHES,  
SHEARS, DIES,  
DROP HAMMERS AND  
SPECIAL MACHINERY.**

Send for 400-page Catalogue. Send for Estimates.

The Stiles & Parker Press Co.,

11 ADAMS ST.,  
BROOKLYN, N. Y.



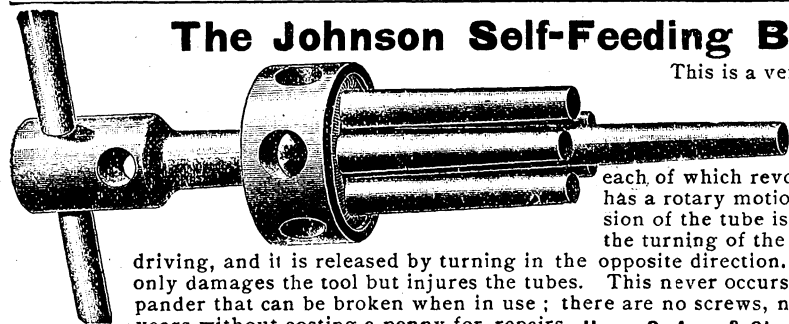
The Dupont Power Hammer.

## The Dupont Power Hammer

Is the only Power Hammer to buy in hard times, on account of its Low Cost, its Economy of Power, and Perfect Reliability.

Send for Descriptive Circular and Price-List.

**The Dupont Manufacturing Co.,  
ST. JOHNSBURY, VT.**



## The Johnson Self-Feeding Boiler Tube Expander.

This is a very simple and efficient tool; it is constructed on correct mechanical principles, and it does its work more effectively and in less time than any other expander made; it will outwear three similar tools of any other manufacture. There are five small rollers, each of which revolves when the centre pin is turned and the tool itself has a rotary motion which produces a uniform pressure and the expansion of the tube is perfect; the small rollers being started at an angle, the turning of the centre pin feeds the expander into the tube without driving, and it is released by turning in the opposite direction. The driving of the centre pin of an expander not only damages the tool but injures the tubes. This never occurs with the JOHNSON TOOL. There is no part of this expander that can be broken when in use; there are no screws, no casings, no rollers on pivots. It will wear for years without costing a penny for repairs. Henry C. Ayer & Gleason Co., N. E. Cor. 2d and Diamond Sts., PHILADELPHIA, PA. Central Office, No. 919 Betz Bldg.,

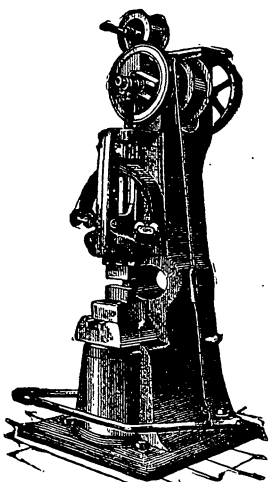
## MILLING MACHINES AND PROCESSES.

A practical treatise on shaping metals by rotary cutters, including information on making and grinding the cutters. By PAUL N. HASLUCK. With upward of 300 engravings, including numerous drawings by the author, 8vo, 352 pages, with 304 engravings, cloth, \$5.00.

Sent, post-paid, on receipt of price by DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade St., N. Y.

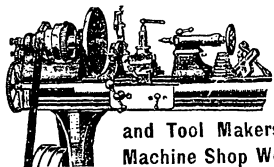
## IF YOU USE Power Hammers

Write to us for Circulars.  
**SCRANTON & CO.,**  
NEW HAVEN, CONN.



N. Y. Office, 15 Murray St.,  
Surpless, Dunn & Alder.  
Chicago Office, 60 S. Canal St. H. O. Skinner.  
Philadelphia Office, 1113 Arch St.,  
Edwin L. McConaughy.

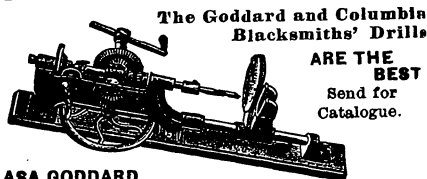
## FOOT POWER LATHES,



For Electrical  
and Experi-  
mental work.  
For Gunsmiths  
and Tool Makers. For General  
Machine Shop Work.

High grade tools: elegant in design, superior in construction. The best foot power lathes made, and quality considered the cheapest. Send for catalogue and prices.

**W. F. & JNO. BARNES CO.**  
9 Ruby Street, ROCKFORD, ILL.



The Goddard and Columbian  
Blacksmiths' Drills

ARE THE  
BEST  
Send for  
Catalogue.

**ASA GODDARD**  
Manufacturer  
Worcester, Mass.

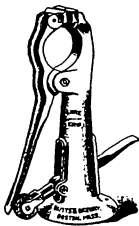
**B. & O. Sure Grip Horseshoers'**  
Adjustable Jaw Foot-Vise

Should be carried in stock by  
every hardware dealer.

Blacksmiths are calling for it.

Send for List and Discount.

**BUTTS & ORDWAY,**  
604 Atlantic Ave., Boston, Mass.



**DRILL PRESSES**  
**THE LARGEST**  
**VARIETY**  
**SEND FOR NEW**  
**30 PAGE CATALOGUE**  
**JUST OUT**  
**DWIGHT SLATE**  
**MACHINE CO.**  
**HARTFORD CONN.**

# LINK-BELT

**ENGINEERING CO.**  
NICETOWN,  
P.H.A.  
49 DEY ST.  
NEW YORK

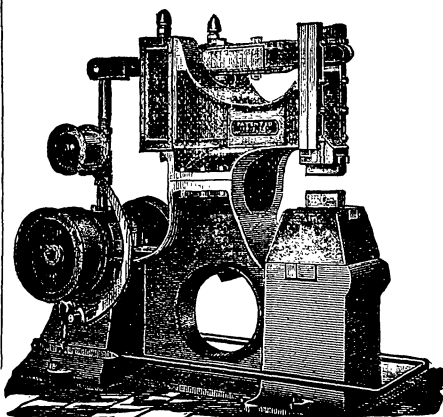
Elevators, Conveyors, Manila Rope Power Transmission Machinery, Ewart Detachable Link Belting  
Dodge Chain, Howe Chain, &c.

General Eastern Agents for Fibre-Graphite Journal Bearings for shafting and machines. Require no oil  
or other lubricant. Moderate in price, durable and guaranteed. Bearings furnished to fit hangers now  
in use.

WESTERN CONNECTION

(CHICAGO,) LINK BELT MACHINERY CO.

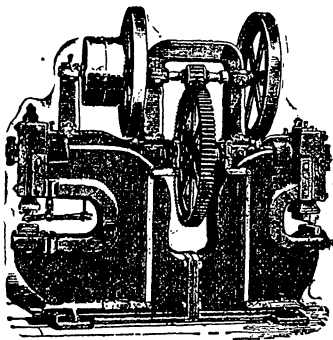
## JENKINS' POWER HAMMERS.



Adjustable and elastic stroke,  
nicety of regulation, efficiency of  
action, simplicity and durability of  
construction and the absence of  
leather straps, steel springs and all  
complication, combine to make this  
hammer the favorite wherever used.

**JENKINS & LINGLE,**  
BELLEFONTE, PA.

## PUNCHES & SHEARS



Double, Single, Multiple, Horizontal,  
Belt and Steam driven. Bending and  
Straightening Rolls, Spacing Tables,  
Doubblers for Sheet and Tin mills.  
Sheet Metal Working Machinery of  
every description. Send for complete  
catalogue.

**The Wais & Roos Punch and Shear Co.**

456-460 Plum St., Cincinnati, O.

Presses of all kinds for

## SHEET METAL WARE.

Wiring, Blanking and Combination  
Dies a Specialty.

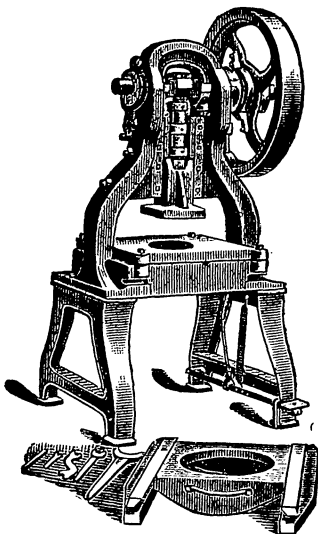
Just out. Special new machinery

FOR MAKING ROUND, SQUARE AND

## CORRUGATED CONDUCTOR PIPE

In 10 Feet Lengths.

WILL TURN OUT 10,000 FEET PER DAY.



**Stark Machine & Tool Co.,**  
**BUFFALO, N. Y.**

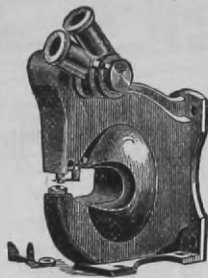
# A FEW GOOD MACHINES,

MADE BY  
**BERTSCH & CO.,**  
CAMBRIDGE CITY, IND.,

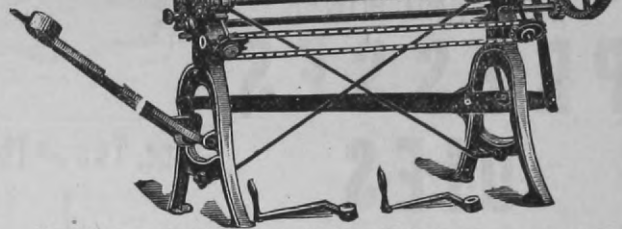


Who will quote price on any tool desired and can make almost anything you need.

**Improved Pat. Combined Punch and Stock Shears.** (7) different sizes from 200 to 1000 lbs. for light or heavy work, 6 to 15 in. throat punch. A general purpose tool adapted for punching and cutting bar and sheet iron as desired. Also make a similar Punch or Stock Shear separate, Power Punches, Improved Pat. Slip Roll Formers, Plate Straightening Rolls, &c. Labor-saving Machines for working Sheet Metal.



General Purpose Punches.  
Powerful & Substantial.



**New Patent Quick Adjustable Slip Roll Formers.** A revolution in quickness and ease of adjustments, and opening the roll in one operation in elevated position as shown to remove the metal. All sizes from 2 in. to 12 in. rolls for large plates. Also similar Crimping or Corrugating Rolls, Improved Plate Straightening Rolls and Tools for working Sheet Metal.

## G. A. Crosby & Co.,

176 and 178 So. Clinton St.  
CHICAGO, ILL., U. S. A.

MANUFACTURE

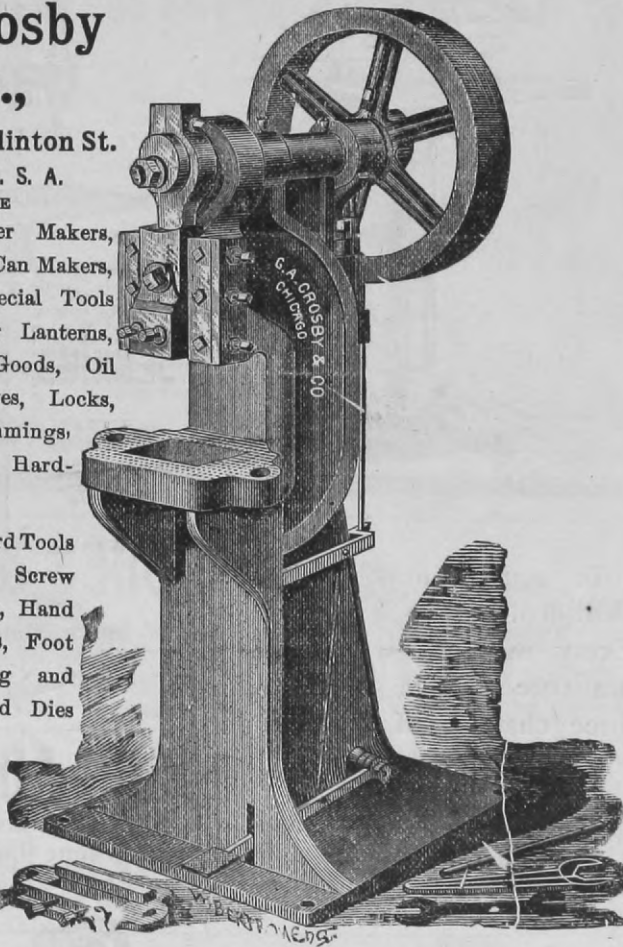
Machinery for Boiler Makers, Sheet Metal Workers, Can Makers, Soap Makers and Special Tools to order for making Lanterns, Bird Cages, Wire Goods, Oil Stoves, Vapor Stoves, Locks, Hinges, Trunk Trimmings, Brass Goods and all Hardware Novelties.

Among their Standard Tools are Power Presses, Screw Presses, Foot Presses, Hand Presses, Drop Presses, Foot and Power Squaring and Trimming Shears and Dies of every description.

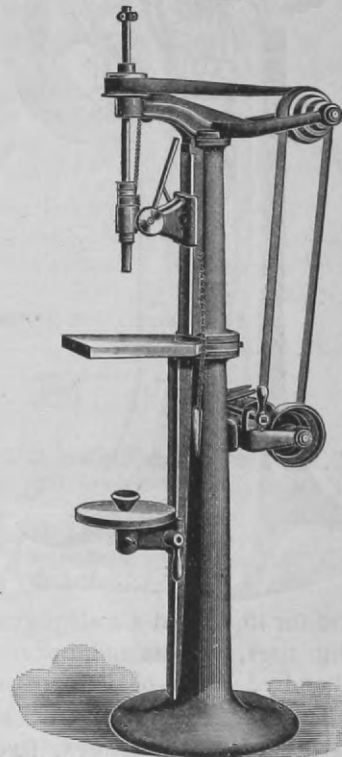
Write for Prices.

Work Guaranteed the Best.

Agents for the Clark Perfection Kerosene Oil System, for heating soldering apparatus.

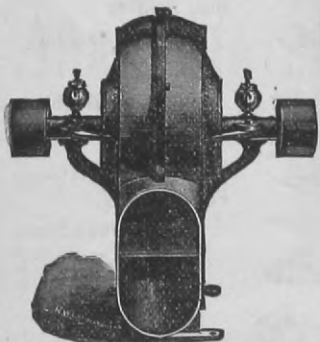


**D'AMOUR & LITLEDAL,**  
204-206 East 43d St., New York,  
MANUFACTURERS OF



**12-INCH SENSITIVE DRILLS,  
BENCH DRILLS**

—AND—  
**Special Machinery.**



(The Smith Forge and Pressure Blower.)

**HANDLING WIND (warm or cold) IS OUR BUSINESS.**

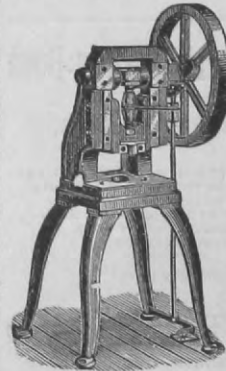
Consequently we have a right to **BLOW**, but as our **BLOWERS** have the name of moving the greatest amount of air with the same expenditure of power, we ask you to try one and let it do the **BLOWING**.

WE MANUFACTURE

**Forge and Pressure Blowers,  
Ventilating Fans,  
Steel Plate Steam Fans,  
Exhaust Fans.**

**The Huyett & Smith Manufacturing Company,**  
Heating and Ventilating Engineers,  
DETROIT, MICH.

CHICAGO, 31 S. CANAL ST. { Branches { BOSTON, 48-54 UNION ST.  
NEW YORK, 26 CORTLANDT ST. { { LONDON, ENG., 70 GRACECHURCH ST.



**A. H. MERRIMAN,**

MERIDEN, CONN.

Manufacturer of all Descriptions of

**PRESSES.**

**Hicks' Builders' Guide.**—Comprising an easy practical system of estimating material and labor for carpenters, contractors and builders. A comprehensive guide to those engaged in the various branches of the building trades. By I. P. Hicks; illustrated by numerous engravings of original drawings. 160 pages; cloth .....\$1.00  
For Sale by DAVID WILLIAMS, 96-102 Reade St., N.Y.



# Ferracute Machine Co.

BRIDGETON, N. J., U. S. A.,

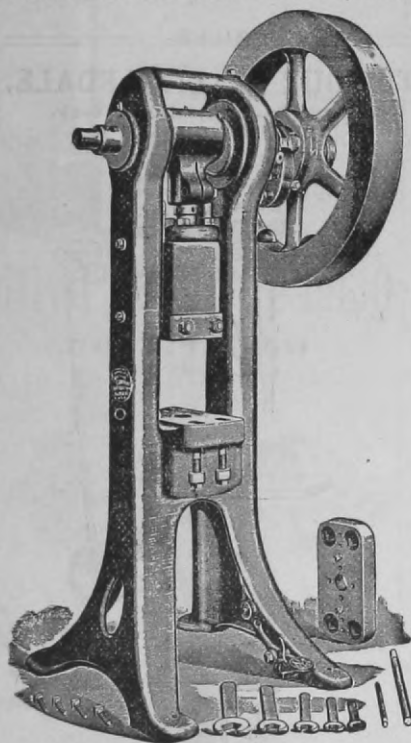
MANUFACTURERS OF

FOOT AND POWER

## PRESSES, DIES,

AND ALL OTHER

Tools for Bar and Sheet Metals.



Send for Illustrated Catalogue containing sizes, weights and prices of one hundred kinds of Presses and other Tools for Brass Goods, Locks, Hardware, Nuts, Washers, Drop Forgings, Railroad, Bridge and other General Machine Shop Work, &c. Also for Tinware, Cans, Boxes, Lamps, Gas Fixtures and Silverware, &c., &c.

### The Metal Worker's Handy-Book

OF RECEIPTS AND PROCESSES,

BEING A COLLECTION OF CHEMICAL FORMULAS AND PRACTICAL MANIPULATIONS FOR THE WORKING OF ALL THE METALS AND ALLOYS, INCLUDING THE DECORATION AND BEAUTIFYING OF ARTICLES MANUFACTURED THEREFROM, AS WELL AS THEIR PRESERVATION.

Edited from Various Sources by

**WILLIAM T. BRANNT.**

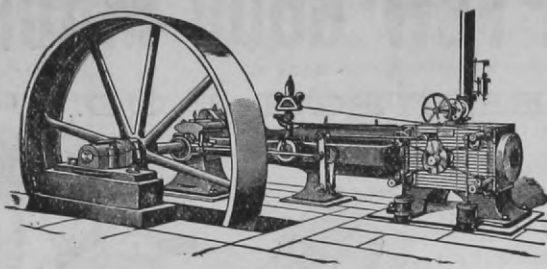
500 Pages, Cloth, \$2.50.

Sent, postpaid, on receipt of price by

**DAVID WILLIAMS, Publisher and Bookseller**

96-102 Reade Street, New York.

## THE LANE & BODLEY CO.,



Cincinnati, O.

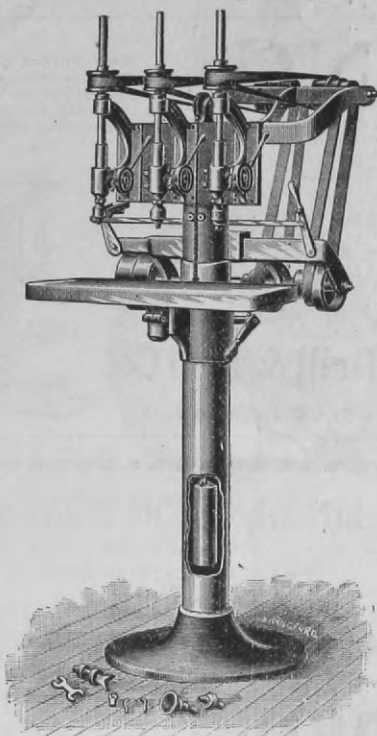
## ENGINES,

ALL SIZES

Simple and Compound,  
CORLISS ENGINES A SPECIALTY.

Heavy Slide Valve Engines.  
Shafting, Hangers, Pulleys,  
Belt Elevator, etc.

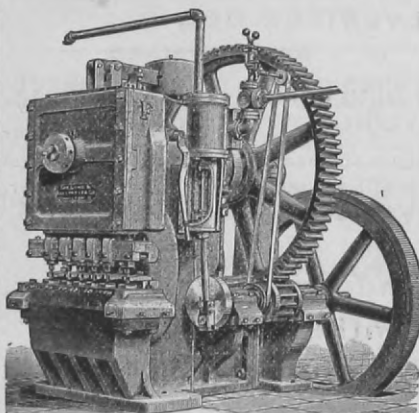
### One, Two and Three Spindle Drills.



In sensitiveness unequalled. Will drill up to  $\frac{1}{2}$  inch holes. Every machine warranted to run true. Each spindle has three changes of speed independent of each other.

**The Sigourney Tool Co.,**  
HARTFORD, CONN.

Special Machines and Tools Built to Order.



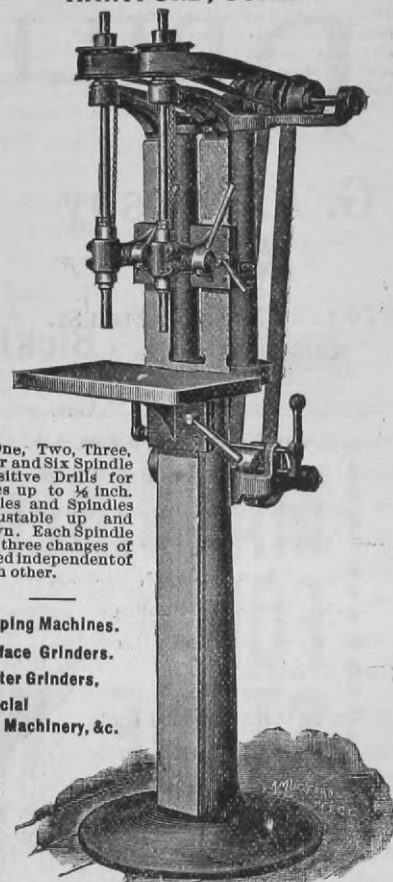
SPICE BAR PUNCH.

**THE LONG & ALLSTATTER CO.,**  
HAMILTON, OHIO, U. S. A.

MANUFACTURERS OF

Belt, Steam and Electrically Driven  
**Power Punches and Shears.**

### Woodward & Rogers, HARTFORD, CONN.



One, Two, Three, Four and Six Spindle Sensitive Drills for holes up to  $\frac{1}{4}$  inch. Tables and Spindles adjustable up and down. Each Spindle has three changes of speed independent of each other.

Tapping Machines.  
Surface Grinders.  
Cutter Grinders.  
Special Machinery, &c.

### JOHN ADT & SON,

New Haven, Conn.,

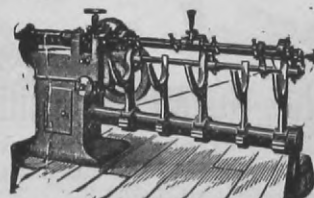
BUILDERS OF

MACHINERY FOR HARDWARE MANUFACTURE.



Electric Rotary-Blow Riveting Machine.

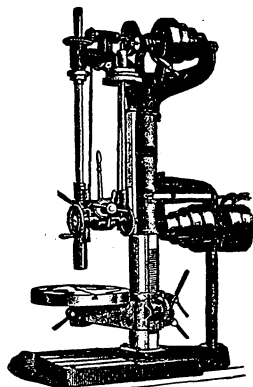
Butt Milling Machinery.  
Butt Drilling Machinery.  
Riveting Machines.  
Wire Straightening Machinery.  
Foot Presses,  
Sprue Cutters,  
Etc.



Automatic Wire Straightening and Cutting Machine

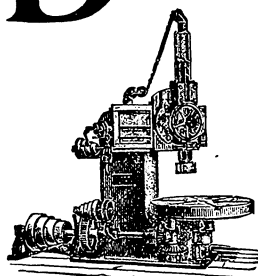
# Our Specialty:

The best, cheapest and most modern.  
Write us for prices before placing  
orders elsewhere. **The Hamilton  
Mch'e Tool Co., Hamilton, O.,** (West  
Market St.). **Western Store, 57  
So. Canal St., Chicago.**



## Drill Presses.

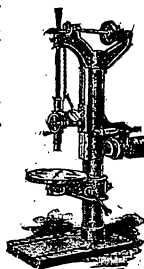
# DRILLING,



like many other things, is unsatisfactory when the tool does not respond quickly and sensitively. Using the "Bickford" you meet with no such difficulty. Ask us for circular and catalogue.

**Bickford Drill & Tool Co.**

10 Lawrence St., Cincinnati, O.

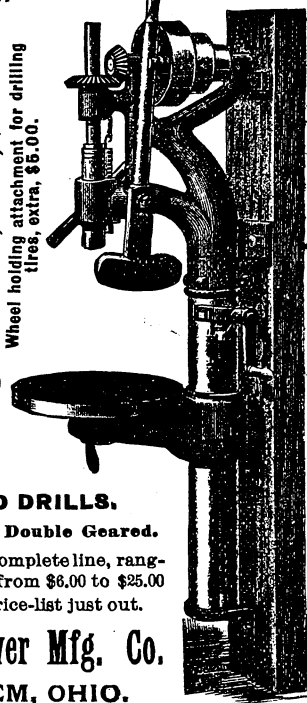


## Silver's Power Post Drill.

FIG. 727.

Has OUT GEARS, and is a thoroughly first-class tool in all respects. Dia. Column, 4 1/2 in.; Dia. Spindle, 1 3/8 in.; and bored No. 2 Morse Taper; Vertical Travel, 6 in.; Drills to centre 19 in. circle.

Weight, 325 lbs.; Price, \$60.00.  
Wheel holding attachment for drilling tires, extra, \$5.00.



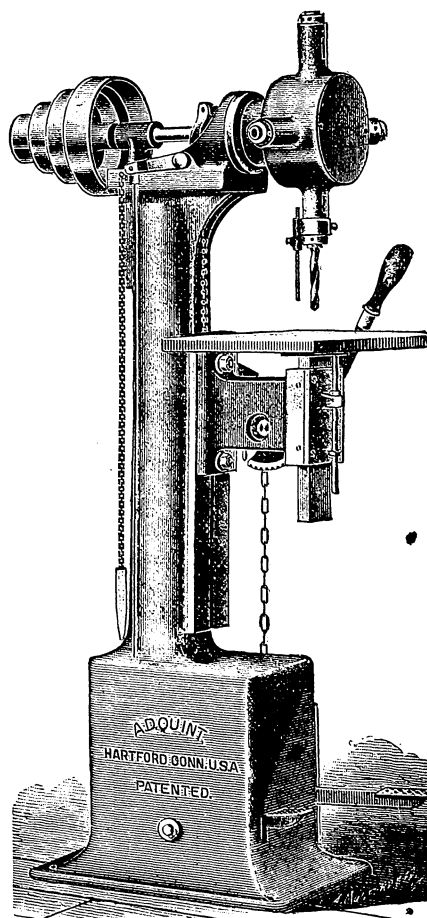
### HAND DRILLS.

Single and Double Geared.

Large and complete line, ranging in price from \$6.00 to \$25.00 list. New price-list just out.

**The Silver Mfg. Co.**  
SALEM, OHIO.

## Quint's Turret Drills. No. 2 Pattern.



This machine is made with from 2 to 12 spindles. All spindles driven direct by bevel gears. Only the spindle in use revolves. Will drill up to 3/4 inch.

Address **A. D. QUINT, Hartford, Conn**

**Practical Hints on Joint Wiping, For Beginners in Plumbing.** This book contains a reprint from *The Metal Worker* of two articles on the method of Joint Wiping, an operation calling for a very large degree of manual skill. It is illustrated from photographs representing the hands and tools when wiping joints in various positions, and gives all the assistance that description of the work can furnish. With thirty-five illustrations, 43 pages, paper, .....\$0.25  
For sale by David Williams, 96-102 Reade St., N. Y.

# MACHINERY FOR STONE WORKING.

**LINCOLN IRON WORKS,**  
RUTLAND, VT.  
New York Office, 182 Front Street.

Stone Working Machinery, Planers, Gang Saws, Rubbing Beds, Derricks and Hoisting Powers, also Gear Castings. See list.

—PULVERIZE—PULVERIZE—PULVERIZE—

## THE GRIFFIN MILL

The only perfect Pulverizer of Quartz, Gold or Silver Ores, Portland Cement, Phosphate Rock, Foundry Facings and all other Refractory Substances. Will work wet or dry. Correspondence solicited. Illustrated pamphlet free.

**BRADLEY PULVERIZER CO.,**

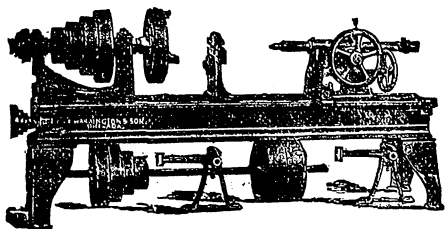
92 STATE STREET, - BOSTON, MASS.

—PULVERIZE—PULVERIZE—PULVERIZE—

## EDWIN HARRINGTON, SON & CO., Incorporated,

1508 PENNA. AVE., PHILADELPHIA, PA.

—: DESIGNERS AND MANUFACTURERS :—



Improved

{ SEND  
FOR  
PRICES. }

Lathes,

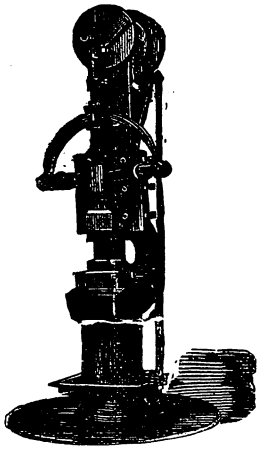
Drills,

Planers.

Double Chain Hoists.

**DEAD-STROKE POWER HAMMERS.**

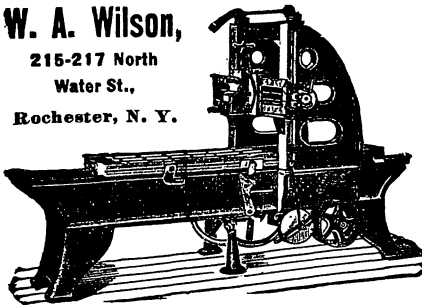
CONSTRUCTION IMPROVED.  
Prices Reduced, <sup>Seven Sizes.</sup>  
to 250 Pounds.



The 15 and 25 pound sizes are specially adapted to plumbers' use, the other sizes for general forging. Send for circular and references.

**DIENELT & EISENHARDT,**  
MAKERS,  
1310 Howard St., Philadelphia.

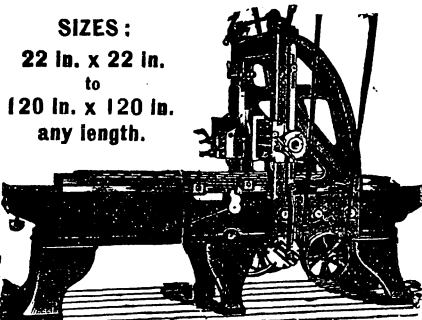
**W. A. Wilson,**  
215-217 North  
Water St.,  
Rochester, N. Y.



Improved Iron Planers a specialty. 20 x 20, 22 x 22, 24 x 24 up to 42 x 42, to plane any length. Send for description and price-list before purchasing. Manufacturers' agent for other tools and machinery. Mention *The Iron Age*.

**THE POWELL PLANNER CO.**

SIZES:  
22 in. x 22 in.  
to  
120 in. x 120 in.  
any length.

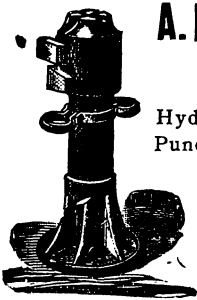


WORCESTER, MASS.

**A. L. HENDERER,**  
Wilmington, Del.

MANUFACTURER OF

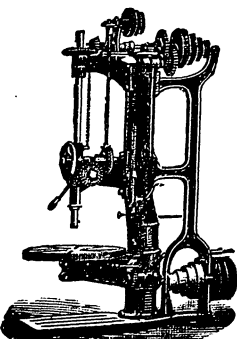
Hydraulic Jacks, Hydraulic  
Punches, Screw Punches,  
Steel Tube Expand-  
ers, Flue Hole Cut-  
ters, Boiler Test  
Pumps and Pipe  
Vises.

**NEW HAVEN MANUF'G CO.**

New Haven, Conn

Manufacturers of

Lathes,  
Planers,  
Shapers,  
Slotters,  
Etc.



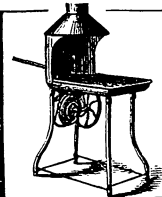
# **BEMENT, MILES & CO.,** PHILADELPHIA, PA. MANUFACTURERS OF **METAL-WORKING MACHINE TOOLS**

FOR  
Railroad Shops,  
Locomotive and Car Builders,  
Machine Shops,  
Rolling Mills,  
Steam Forges,  
Ship Yards,  
Boiler Shops,  
Bridge Works,  
etc., etc.

**Steam Hammers,  
Steam and Hydraulic Riveting Machines.**

# Sturtevant Forges.

THE STURTEVANT  
PORTABLE FORGES  
ALL SIZES & STYLES  
SEND FOR CATALOGUES TO  
B. STURTEVANT © BOSTON MASS.  
NEW YORK, PHILADELPHIA, CHICAGO, LONDON.

**SOMETHING NEW.****The "M. & P." Friction Drop Hammer.**

Entirely New Principle for Working the Rolls. Positive and Quick  
Action. Strong and Durable.

**NO BOLTS OR NUTS ON LIFTER**  
TO JAR LOOSE.

**Miner & Peck Mfg. Co., New Haven, Ct.**

Engravings Show the Style of Die  
Head which the

**Bignall & Keeler Mfg. Co.,**

ST. LOUIS, MO.,

PLACE ON THEIR

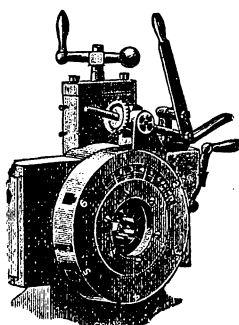
**PEERLESS AND DUPLEX**

**Pipe Threading & Cutting Machines.**

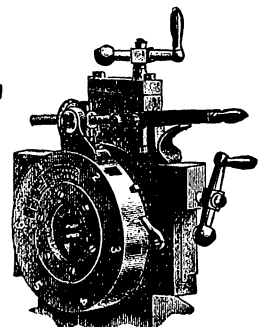
Write for Prices on the

**Most Perfect and Economical Line  
of Machines on the Market.**

Mention *The Iron Age*.

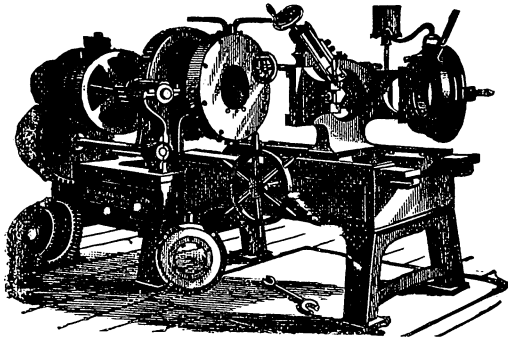


Peerless" Head showing  
dies expanded.



"Peerless" Head showing  
dies closed.





# D. SAUNDERS' SONS,

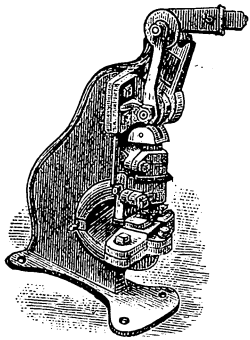
—MANUFACTURERS OF—

## Pipe Cutting and Threading Machines

For Pipe-Mill and Steam Fitters' Use. Tapping Machines for Steam Fitting. Also Steam and Gas Fitters' Hand Tools.

—SEND FOR CIRCULARS.—

No. 25 Atherton Street, - YONKERS, N. Y.

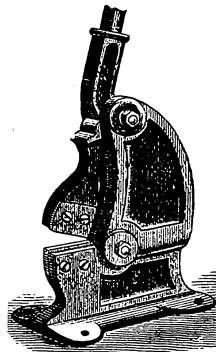


## PUNCHES —AND— SHEARS.

Hydraulic  
PRESSES,  
PUMPS,  
ACCUMULATORS,  
JACKS, &c.

SEND FOR CATALOGUE E.

WATSON & STILLMAN, 204-210 E. 43d ST., NEW YORK.

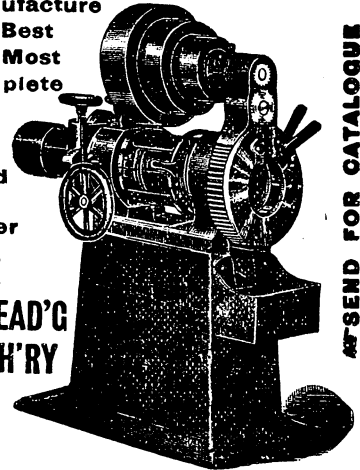


The Merrill Manufacturing Co.,  
TOLEDO, O.

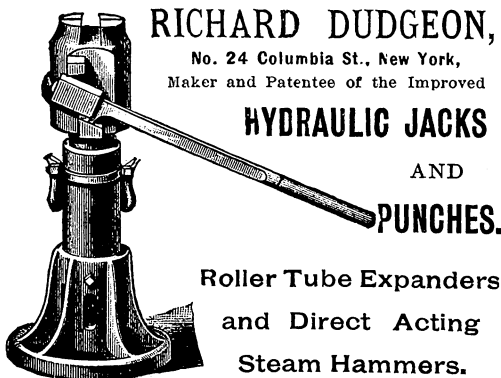
Manufacture  
The Best  
and Most  
Complete  
Line  
of

Hand  
and  
Power

PIPE  
THREADING  
MACH'RY  
IN  
USE.



SEND FOR CATALOGUE



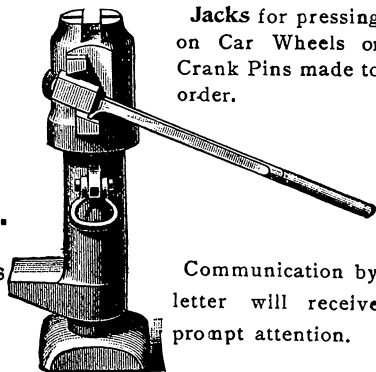
RICHARD DUDGEON,  
No. 24 Columbia St., New York,  
Maker and Patentee of the Improved

HYDRAULIC JACKS

AND

PUNCHES.

Roller Tube Expanders  
and Direct Acting  
Steam Hammers.

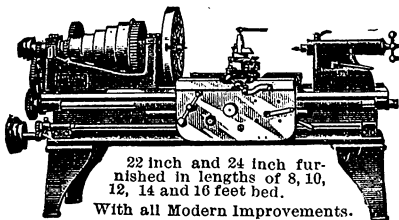


Jacks for pressing  
on Car Wheels or  
Crank Pins made to  
order.

Communication by  
letter will receive  
prompt attention.

Coal Mining for the Use of Colliery Managers and others. By HERBERT W. HUGHES. In the preparation of this work the author's aim has been to supply a text book containing all the information with which the student and the practical miner should be familiar. The details of general colliery work are fully described, and at the end of each chapter is given a carefully selected list of memoirs, in which fuller information can be sought. CONTENTS: Geology; Coal; Search for Coal; Breaking Ground; Sinking; Preliminary Operations; Methods of Working; Haulage; Winding; Pumping; Ventilation; Lighting; Works at Surface; Preparation of Coal for Market. 8vo, cloth... \$6.00

For sale by DAVID WILLIAMS, 96-102 Reade St. N. Y.



22 inch and 24 inch furnished in lengths of 8, 10, 12, 14 and 16 feet bed. With all Modern Improvements.

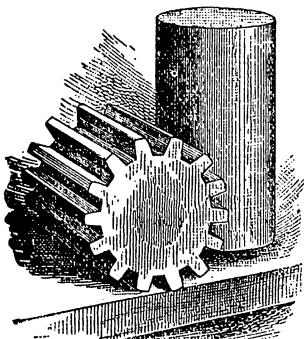
Dietz, Schumacher & Co.,  
Cincinnati, Ohio, U. S. A.

Radial Drills.

The best is the Cheapest. We make the best.

# Eng. Lathes.

# HYDRAULIC FORGING.



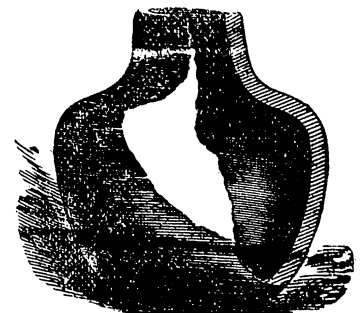
Billet and Patent Hot-Pressed Steel Pinion.

Steel Bottles, Air and Gas Receivers drawn from Solid Steel or Plates, Crank Shafts, Straps. Wrists, Pins, Irregular Shapes, Discs, Cups, Boiler Heads, Steel Flanges for High Pressure Steam, Drawn Steel Tubing for Bicycles, Boilers, Etc.

THE UNITED STATES PROJECTILE CO.,

1st Ave. and 53d St., Brooklyn, N. Y.

CORRESPONDENCE SOLICITED



Steel Bottles, any thickness or shape.

# Don't Buy

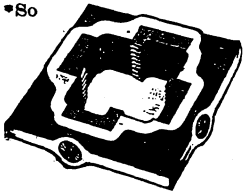
## \*Maule's "Skeleton" Pipe Die

### If You Wish to Avoid

A Pipe-Threading Die extremely easy of operation by reason of the proper clearance of its cutters;  
 Of surpassing durability secured by the accurate and uniform temper of said Cutters;  
 Having Cutters that when dull may be removed in a moment, and sharpened on a grindstone or emery wheel;  
 Of phenomenal cheapness, arising from small first cost coupled to excellence of quality.

*If by chance you do not think these points, or the saving of money, objectionable,*

\*80

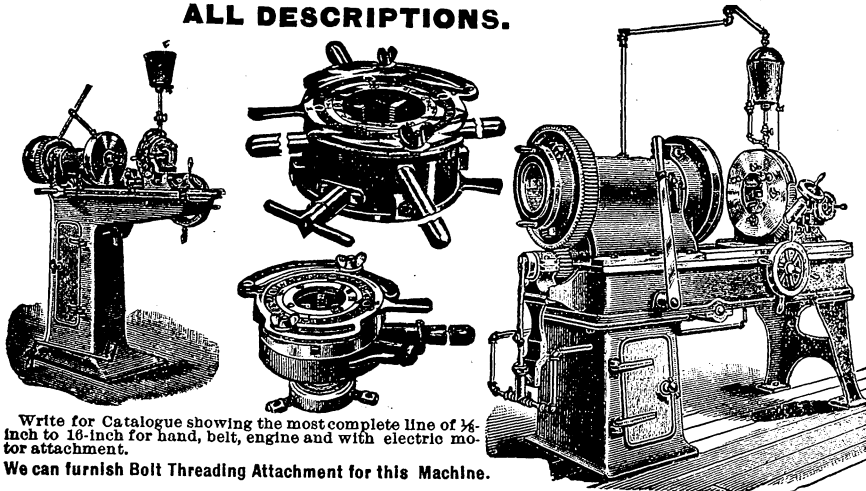


Send us a Postal Note for 62 Cents (do not send us any postage stamps), and we will mail you a sample one-inch Die, either  $2\frac{3}{8}$  or  $2\frac{1}{2} \times \frac{3}{4}$  thick, which we hereby agree to take back if not to your satisfaction.

**HENRY B. PANCOAST & CO.,**  
 PHILADELPHIA, U. S. A  
*Send for Catalogue of the "Skeleton" Pipe Die*

## JARECKI MFG. CO. (Limited), Erie, Pa

### PIPE THREADING AND CUTTING TOOLS OF ALL DESCRIPTIONS.



Write for Catalogue showing the most complete line of  $\frac{1}{8}$ -inch to 16-inch for hand, belt, engine and with electric motor attachment.  
 We can furnish Bolt Threading Attachment for this Machine.

Wire Drawing Machines, **WATERBURY**  
 Gang Slitters,  
 Power Presses and Dies, **MACHINE CO.,**  
 Waterbury, Conn.  
 Tumbling Barrels,  
 Special Machinery. **MANUFACTURERS.**

Send For Prices.

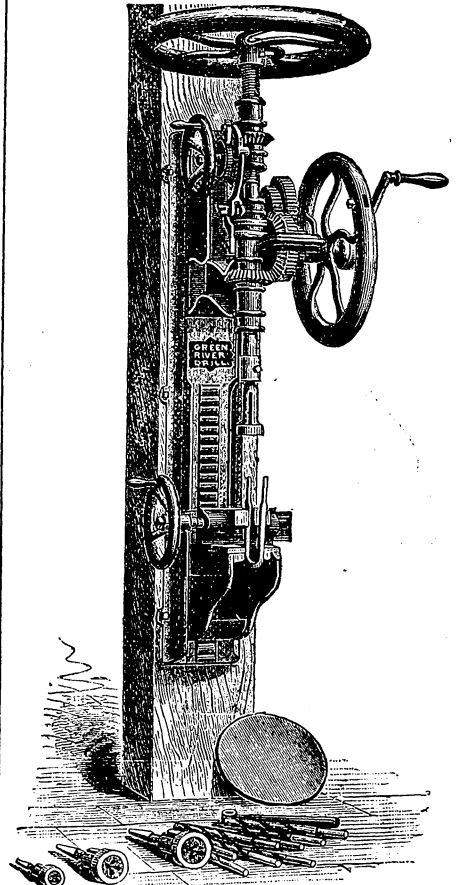
## Catalogue of Books,

Including the principal works on Metallurgy, Mineralogy, Engineering, Electricity, Mechanics, &c., sent free to any address, by

**DAVID WILLIAMS, Publisher,**  
 96-102 Reade Street, NEW YORK.

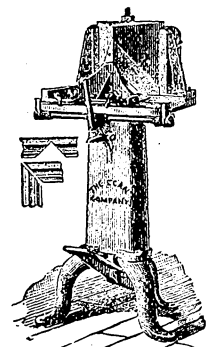
## GREEN RIVER

Hand Drilling Machine No. 4 with  
 Screw Cutting Attachments.  
 SEND FOR 168-PAGE CATALOGUE.



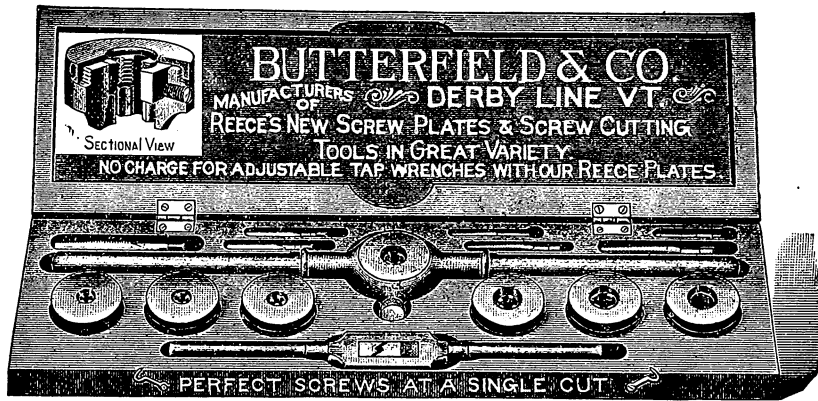
**WILEY & RUSSELL MFG. CO.,**  
 Greenfield, Mass., U. S. A.

NEW YORK AGENCY FOR  
**WILEY & RUSSELL,**  
 120 LIBERTY STREET.



Foot Power Miterer and Jointer.

**THE EGAN CO.,**  
 179 to 199 W. Front St.,  
 CINCINNATI, OHIO, U. S. A.  
 MAKERS OF  
**WOOD-WORKING MACHINERY**  
 FOR ANY PURPOSE.  
 Highest honors World's Fair.



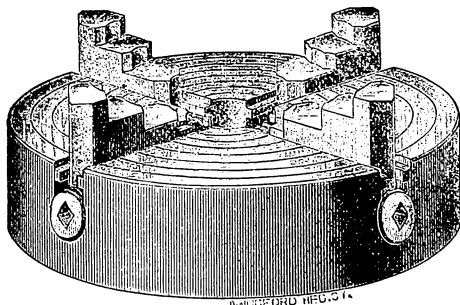
## "CUSHMAN" CHUCKS.

For Lathes, Drills, Chucking and Screw Machines, and for special use.

SEND FOR CATALOGUE.

**The Cushman Chuck Co.,**  
Hartford, Conn.

## CHAMPION INDEPENDENT CHUCKS.



An entirely new line of small Chucks, provided with 3 or 4 independent reversible steel jaws. The best Chuck in the market for foot lathes. Ask your dealer for them or write to us.

**THE D. E. WHITON MACHINE CO.**

Sole European Agents, SELIG SONNENTHAL & CO., LONDON.

New London, Conn.



Three styles of Screw Plates **BUILT ENTIRELY ON HONOR**, with prices to suit all. Write for catalogue.

**CHAMPION BLOWER & FORGE CO., - - LANCASTER, PA**



**THE DUPLEX,**  
**Best on Earth.**

30,000 in Daily Use.

**HART MANUFACTURING CO.,**

CLEVELAND, O., U. S. A.



FOR BOLTS.

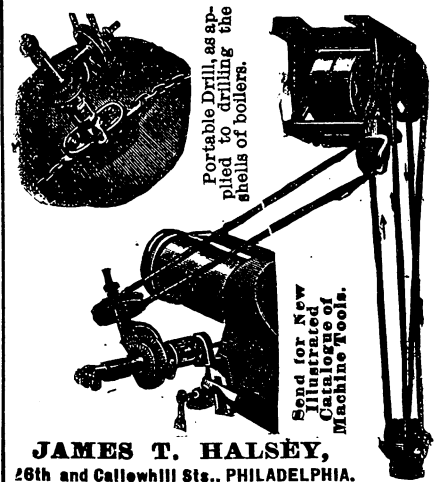
## FRICTION CLUTCHES, SHAFTING, HANGERS, PULLEYS.

Sheaves for Rope Driving.  
Gear Wheels.

## FRICTION PULLEYS.

## KEYSTONE CLUTCH AND MACHINE WORKS,

1708-1710 Germantown Ave.,  
PHILADELPHIA, PA.



## Portable Drilling and Tapping Machines.

**ALBERT M. COLBURN.**

Wall St., New Haven, Conn.

Send for New No. 4 Catalogue.

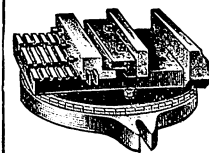
## WE LEAD.

Sweetland Combination Chucks. Simple, accurate, original. Standard Independent Chucks, Solid Shell, Solid Reversible Jaws.

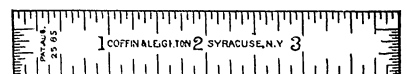


The Hoggson & Pettis Mfg. Co.  
New Haven, Ct.

## SKINNER PATENT CHUCKS.



Independent Lathe Chucks. Universal Lathe Chucks. Combination Lathe Chucks. Lathe Chucks with Patent Reversible Jaws. Planer Chucks, Drill Chucks, Face-Plate Jaws, &c. **THE SKINNER CHUCK CO.** New Britain, Conn., U. S. A.



## MACHINISTS' SCALES,

PATENT END GRADUATION.  
Liberal Discount to the Trade. Send for List.

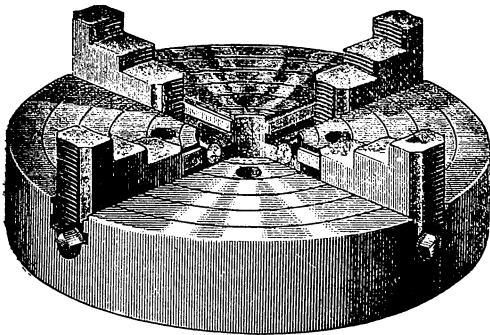
**COFFIN & LEIGHTON, Syracuse, N. Y.**



**CHUCKS** The National All sizes and styles. Patented Reversible Jaws. Illus. catalogue. The standard Chuck since 1882. Address **W. WHITLOCK,** 39 Cortlandt Street, New York.

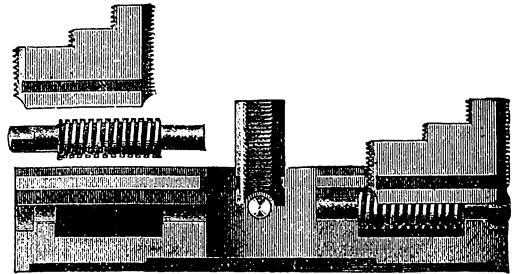
# IMPROVED INDEPENDENT LATHE CHUCK.

No. 18.



DIAMETER.	PRICE.
4 Inch Chuck, Four Jaw,	\$14.00
6 " " " "	18.00
8 " " " "	22.00
10 " " " "	26.00
12 " " " "	30.00
14 " " " "	34.00
16 " " " "	35.00
18 " " " "	38.00
20 " " " "	44.00
22 " " " "	50.00
24 " " " "	57.00
26 " " " "	65.00
30 " " " "	120.00
36 " " " "	210.00

Jaws Reversible.


**UNION MANUFACTURING CO. New Britain, Conn.**

Warehouse, 103 Chambers Street, New York City.

## WELLS BROS. & CO., GREENFIELD, MASS., U. S. A.,

MANUFACTURERS OF

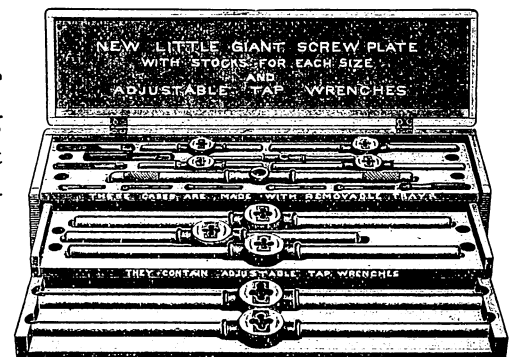
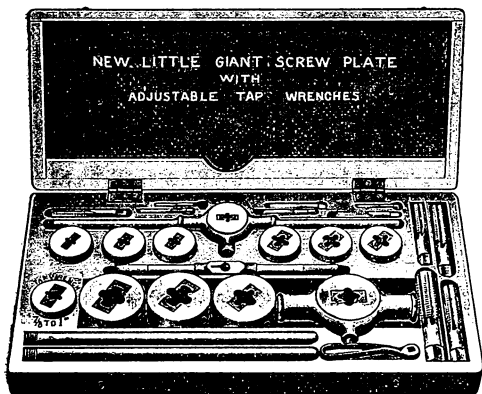
THE CELEBRATED

### "LITTLE GIANT" SCREW PLATES.

In great variety. Cutting all sizes from the smallest bicycle rod to one and one-half inch diameter bolts.

ALSO MANUFACTURERS OF

Blacksmiths' Carriage-Makers', Machinists' and Amateurs'

**Labor-Saving Tools and Machinery.** SEND FOR OUR FULL ILLUSTRATED CATALOGUE.


OUR ADJUSTABLE STOCKS and DIEM are universally acknowledged to be the BEST! We also make all our Tools on the same principle of the Best Material and Workmanship, and always with a view of time and labor saving in their use.

THE AGE OF STEEL

Requires

EXTRA HEAVY TOOLS.

To meet the demand.

**The Putnam Machine Co.**

Are now building a new line of

**LATHES AND PLANERS**

For particulars and prices of their

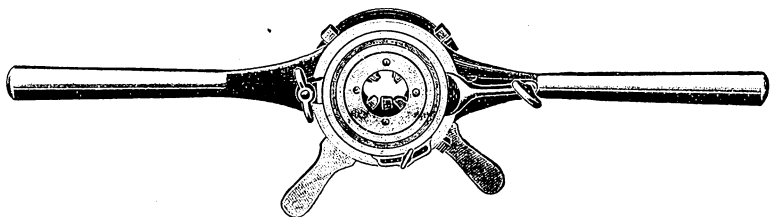
**STEEL TOOLS**

Address their salesman,

**J. M. SEIBERT,**

on F, PHILADELPHIA, PA.

## THE LATEST AND BEST INVENTION.



The Oster Patent Adjustable Die Stocks, with Guides for Plumbers, Gas and Steam Fitters, Machinists, Carriage Makers and Blacksmiths. Not equaled in Material, Construction or Finish. Warranted the best hand tools in market. Write for illustrated price-lists and discounts.

**THE OSTER MFG. CO.,**

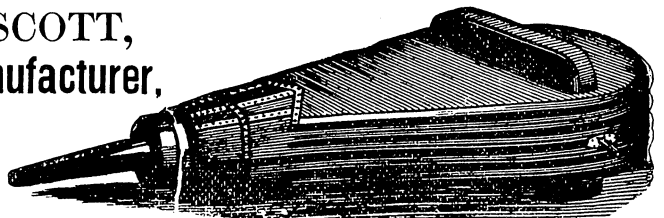
Cleveland, Ohio, U. S. A.

**GEO. M. SCOTT,**  
**Bellows Manufacturer,**

Johnson Street

Cor. 22d St.,

CHICAGO, ILL.



## BOOKS

THE NEWEST BOOKS ON Metal Working, Iron, Steel and Metallurgy; Mining, Mechanical and Civil Engineering; Casting and Founding; Electricity and Electric Lighting; Draftsmanship Architecture and Building, promptly supplied on receipt of price. SEND FOR CATALOGUES, mentioning the kind of book you are looking for.

**DAVID WILLIAMS, 96-102 Reade St., New York.**

# THE STANDARD TOOL CO., CLEVELAND, OHIO.

MANUFACTURERS OF

**Increase Twist Drills, Reamers, Taps, Milling Cutters and Chucks.**

Taper Shank Drills,  
St. Shank Drills,  
Screw-Driver Bits,  
Reamers,  
Shell and Solid  
Taper Reamers.

**Bit Stock Drills for Metal or Wood.**

**Wood-Boring Brace Drills, will cut off nails.**

Hand Taps,  
Mach. Screw Taps,  
"Standard" Drill  
Chuck,  
"Ellenwood" Drill  
Chuck,  
Sq. Shank Drills  
for Ratchets,  
Twist Drills for  
Blacksmiths'  
Presses.

Sockets for  
Taper Shank  
Drills.

Reamers in  
all sizes.

**NEW YORK OFFICE, 33 CHAMBERS ST. Send for Catalogue,**

1874.

OLD RELIABLE.

1894.

SEND

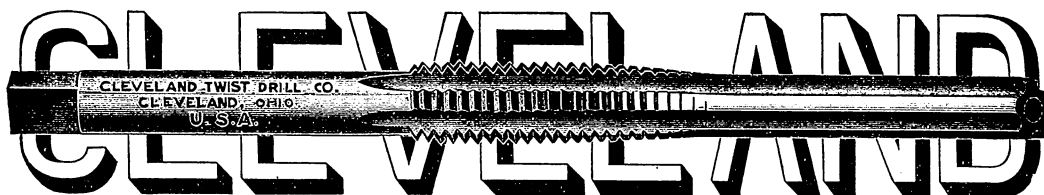
WRITE

FOR

FOR

CATALOGUE.

DISCOUNTS.



**Our Drills are Hot Forged. The best part of the steel IS NOT CUT OUT and thrown away.**



**They are TOUGHER, STRONGER, BETTER than is possible to attain by milling. Catalogue and Discounts sent on application.**

## MORSE TWIST DRILL & MCH. CO.,

## STOW FLEXIBLE SHAFT,



**DRILLS, REAMERS, CUTTERS,**



**BEACH CHUCKS, TAPS, DIES.**



Factory, NEW BEDFORD, MASS.

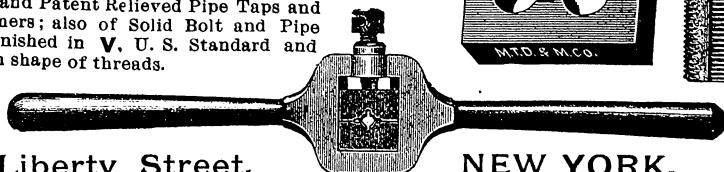
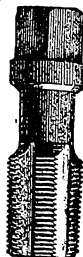
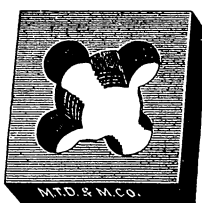
Catalogues on application.

## MANNING, MAXWELL & MOORE,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO'S



Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Relieved Pipe Taps and Pipe Reamers; also of Solid Bolt and Pipe Dies. Furnished in V. U. S. Standard and Whitworth shape of threads.



111 Liberty Street,

NEW YORK.

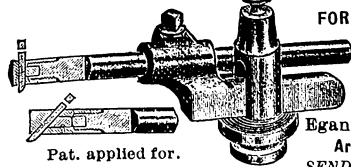
Boring Tool.

## The Armstrong Tool Holders

Lathe and

FOR TURNING, PLANING AND BORING METALS.

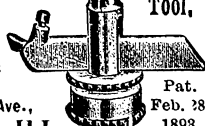
Planer  
Tool.



Pat. applied for.

Practical all-around, every-day tools. Drop Forged of Steel and finished in a first-class manner. Nearly 15,000 already in use. 200 working in The J. A. Fay & Egan Co.'s shops. Manufactured only by

Armstrong Bros. Tool Co., 78 Edgewood Ave.,  
SEND FOR CIRCULARS. CHICAGO, ILL.



Pat.  
Feb. 28  
1893.

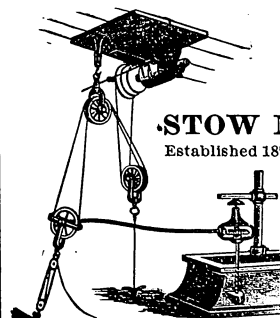
Invented and  
Manufactured by

THE

STOW MFG. CO.,  
Established 1875. Binghamton,

N. Y.  
**PORTABLE,**

DRILLING  
TAPPING,  
REAMING.

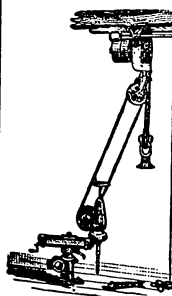


General European Agents,

SELIG SONNENTHAL & CO.,

85 Queen Victoria St.,

LONDON, ENGLAND.



Thos. H. Dallett & Co.,

York St. and Sedgley Ave.,

PHILA.

MANUFACTURERS OF

Portable Drills, Hand  
Drills, Boiler Shell  
Drills, Electric Motors  
especially adapted for  
driving Machine Tools,  
Cranes, Elevators,  
Pumps, Presses and  
other machinery.

Complete Power and  
Light Plants Installed.

## Stow Flexible Shaft Co., Limited,

6th, Callowhill & Biddle Sts.,

PHILA., PA.,

Manufacturers of

**PORTABLE DRILLING,  
TAPPING, REAMING,  
and BORING MACHINES**

Also, Tools for Emery Wheel  
Grinding, Metal and Wood Pol-  
ishing, Cattle Brushing and  
Clipping, &c.

Gen'l European  
Agents,

Bolling & Lowe,

2 Lawrence

Peuntney Hill.

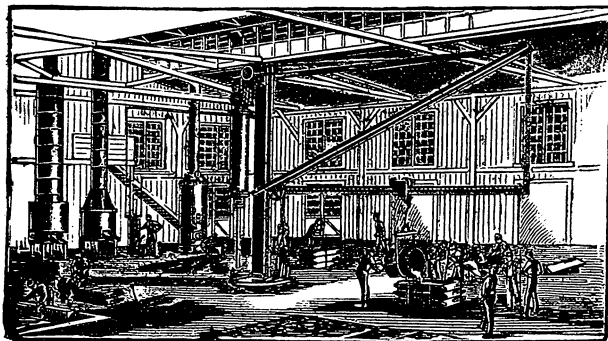
LONDON, ENG.



# Don't Often See One Just Like This? Got on to the Ridgway Crane, Hence His Gratitude.

EDITOR OF "THE FOUNDRY," Detroit, Mich.

DEAR SIR:—Please see that "The Foundry" reaches us hereafter as we would not be without it for a great deal. It contains much that should be of interest to every foundryman. Just as an example, it may please you to know that it was through the advertisement in your paper that we bought both the Cranes in our shop from Craig Ridgway & Son in Pennsylvania and they are the best thing of the kind we ever saw. \* \* \* \* \*



DANVILLE, ILL., JULY 17, 1894.

DANVILLE FOUNDRY & MACHINE CO.  
By WM. STEWART, Pres

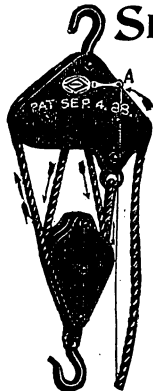
A man in love with a trade paper because it told him of the Ridgway Steam Hydraulic Crane! Can you imagine higher praise? No, we are not partners with the publisher of "The Foundry," but anything we can print to show people that the Ridgway Crane is the greatest thing in the crane line ever devised, we are going to print.

No Mill, or Foundry, or Yard can afford to use any other sort of a crane. We don't simply please people, we **delight them**. They don't know what a crane is till they use a Ridgway Crane. Does the work instantly and noiselessly and without cost for anything.

We make dozens of styles and modifications to suit every kind of situation, to do work Quickly and Cheaply. Also Elevators and Stock Hoists worked by Steam Hydraulic.

SEND PARTICULARS FOR CIRCULARS.

## CRAIG RIDGWAY & SON, - Coatesville, Pa.



SELL THE BEST.

THE "SURE GRIP"  
Steel Tackle Block

is taking the place of all other hoisting blocks.

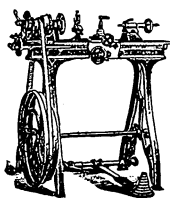
Send for catalogue and discount.

Fulton Iron & Engine Works,  
28 Brush St., Detroit, Mich.

ESTABLISHED 1852.

—OR—

Rice Lewis & Son, Ltd.,  
TORONTO, CAN.



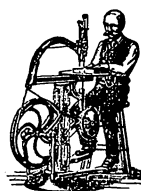
Foot & Hand Power Machinery.

Screw Cutting Lathes, Wood Turning Lathes, Scroll Saws,  
Circular Saws, Moulders, Mortisers, Etc.

Strictly High Grade. Catalogue Free.

SENECA FALLS MFG. CO.,  
255 Water St., Seneca Falls, N. Y., U. S. A.

London Agency, MESSRS. CHAS. CHURCHILL & Co., 21 Cross St.,  
Finsbury, London, E. C., England.



# LATHES.

ISRAEL H. JOHNSON, JR., & CO., - PHILADELPHIA.

**LATHES,** PLANERS, SHAPERS, DRILLS, TOOLS.  
Workmanship, Material, &c., Best. Prices Low.  
SEBASTIAN LATHE CO., 113 & 115 Culvert St.  
CINCINNATI, O.  
MODERN DESIGNS. CAT. FREE.

## Penn Elevator Engineering Co.. ELEVATORS

WORKS:  
BLOOMSBURG, PA.

PHILADELPHIA

OFFICE:  
516 COMMERCE ST.

MANUFACTURERS  
AND BUILDERS

Hydraulic and Direct Electric Passenger and Freight Elevators,  
Steam, Belt and Hand Power Elevators of every description,

With Automatic Doors or Gates.

## ELEVATORS. FREIGHT.

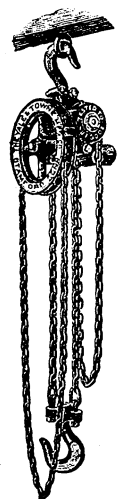
Any Carpenter can put them up.

And any Hardware Dealer can make a splendid profit selling them.

We also make a full line of Dumb Walters and Lifts.

The Warner Elevator  
Mfg. Co.,

BRIGHTON STATION, CINCINNATI, O.



DUPLEX  
CONVERTIBLE SCREW BLOCK.

"Safety"

—OR—

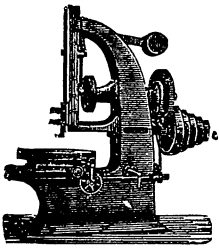
"Dispatch"  
Lowering at Will.

The Yale & Towne Mfg. Co.  
STAMFORD, CONN.

New York, 84-86 Chambers St.  
Chicago, 152-154 Wabash Ave.  
Philadelphia, 1120 Market St.  
Boston, 224 Franklin St.  
Pittsburgh, Times Bldg.,  
San Francisco, Mills Bldg.

**Engine Room Chat.** By ROB. GRIMSHAW. This little book presents in colloquial style ideas which appeal to all interested in the generation of power, more particularly those charged with the care of engines and boilers and their appurtenances. 148 pages, cloth.....\$1.00  
For sale by DAVID WILLIAMS, 98-102 Reade st., N. Y.



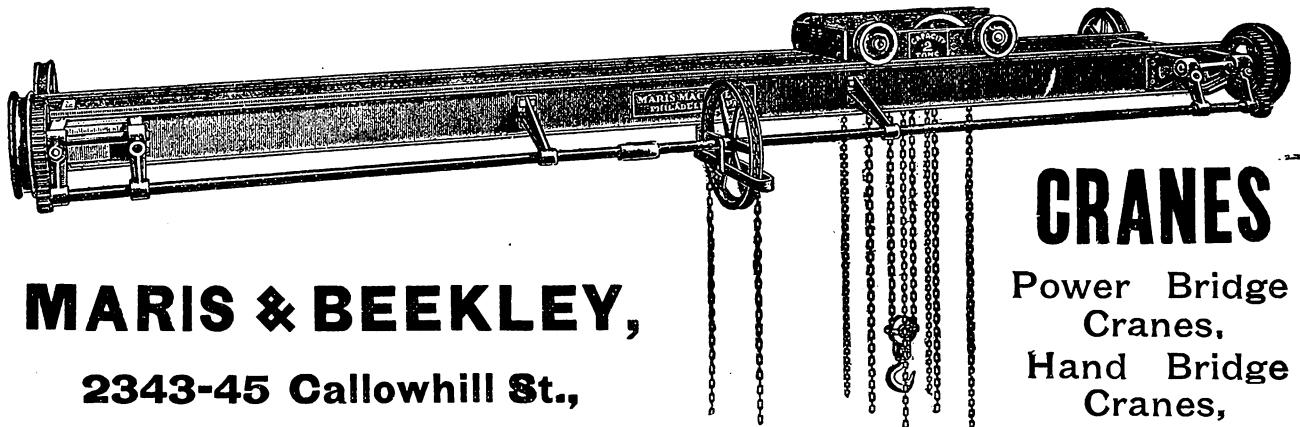
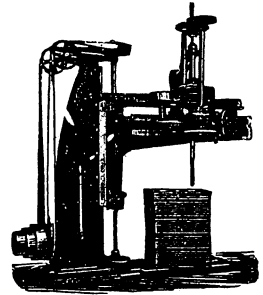


*William Sellers & Co., Incorp.*

PHILADELPHIA, PA.,

—MANUFACTURERS OF—

Improved Machine Tools for Working Iron and Steel,  
High Speed Power Traveling and Swing Cranes,  
Injectors, Locomotive Turn Tables, Shafting, &c., &c.  
Testing Machines, under patents of A. H. Emery.  
Prices, Descriptive Matter, &c., Furnished on Application.



**MARIS & BEEKLEY,**

**2343-45 Callowhill St.,**

PHILADELPHIA.

**CRANES**

Power Bridge  
Cranes,  
Hand Bridge  
Cranes,  
Jib Cranes.

**OPEN SIDE PLANERS.**

READY FOR IMMEDIATE DELIVERY.

**SPECIAL MACHINERY.**

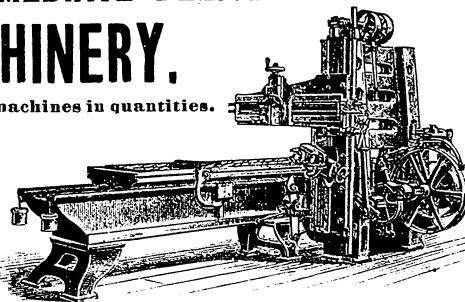
We will take pleasure in estimating on machines in quantities.

**DETRICK & HARVEY**

**MACHINE CO.,**

MANUFACTURERS,

BALTIMORE, - - MD.



**SPEIDEL & ROEPER,**  
807 & 809 Cherry Street,  
READING, PA.

Manufacturers of Spidel's Patent  
Economic Safety Hoists,

500 to 30,000 lbs. capacity.

Have been awarded the "John Scott Medal and Premium" by the Franklin Institute of the City of Philadelphia, also Medal and Diploma by the World's Columbian Exposition, at Chicago, for Highest Efficiency, Simplicity and Durability.

With our hoist one man can lift two or three times as fast as with any other hoist. It has two speeds, and is guaranteed to give satisfaction. Traveling and Swing Cranes up to 30,000 lbs. capacity and 60 ft. span. Overhead Tramway, Trolleys, Switches and Special Hoisting Machinery.

Self-contained Elevators and Dumb-waiters. Illustrated catalogue and prices on application.

**MORSE,**

**WILLIAMS**

**& CO.**

Morse Elevator Works.

MANUFACTURERS AND BUILDERS OF  
ELECTRIC, HYDRAULIC, BELT and HAND  
POWER PASSENGER and FREIGHT

**ELEVATORS.**

1105 Frankford Ave., Philadelphia. 108 Liberty St., New York.  
1116 E. St., N. W., Washington, D.C. 33 Lincoln St., Boston.  
425 Spruce St., Scranton, Pa. 82 Church St., New Haven.  
Omaha Building, Chicago, Ill.

**FAIRMOUNT MACHINE CO.,**

(Successors to Thomas Wood & Co.)

Twenty-second and Wood Sts., Philadelphia, Pa.

Shafting, Gearing, Self-Oiling Bearings, Friction Pulleys, Elevators.

Rope Transmission; Sheave Wheels, any size required, for Hemp, Manila and Cotton Rope Driving. Looms, Cotton and Woolen Machinery for Winding, Spooling, Reeling, Beaming, Warping, Dyeing, Sizing, Scouring &c.

**Moore Mfg. & Fdry. Co.,**

Milwaukee, Wis., U. S. A.,

Manufacturers of

Moore's Anti-Friction

Differential

Chain

Pulley

Block.

A New Movement!  
A Perpetual Compound Lever!

Powerful, Simple and Durable!

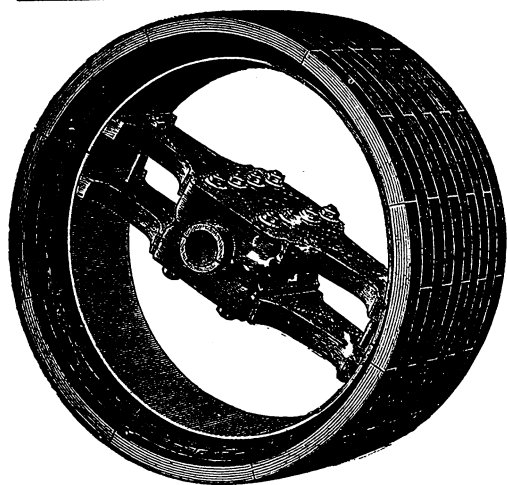
One Man Can Lift to the Full Capacity of the Block.

Self-Sustaining at Any Point.

The Block Always Hangs Plumb.

Send for descriptive price list mentioning this paper.





# Use only the Strictly High Grade Dodge Patent WOOD SPLIT PULLEY, WITH PATENT STANDARDIZED BUSHING SYSTEM.

Built for work, not ornament. We make but one grade—that the best. Our bushings are bored and turned from solid wood. We claim the only honestly made and first-class Wood Split Pulley, suitable for all around service. So simple any one can adjust to shaft. We are sole **Manufacturers** and **have no licensees.**

Sales agencies all over the world. Send for list. Also manufacture Self-Oiling Hangers, Shafting, Split Friction Clutches, Iron Rope Sheaves and full line of Power Transmission Appliances.

## Dodge Manufacturing Co.,

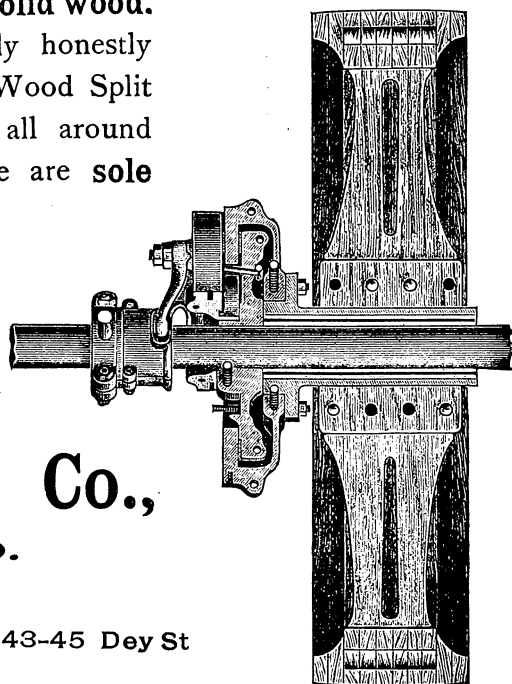
Works, MISHAWAKA, IND.

BRANCHES WITH LARGE STOCKS:

Chicago, 166-174 So. Clinton St.

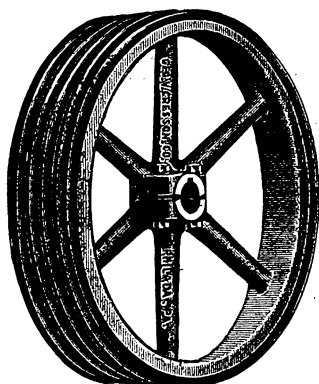
New York, 43-45 Dey St

Boston, 137-139 Purchase St.



## GEO. V. CRESSON CO.

18th STREET AND ALLEGHENY AVE.  
PHILADELPHIA, PA.



## ROPE WHEELS,

All Diameters and Number of Grooves, for Manilla, Hemp, Cotton, or Leather Ropes.

**PAPER MACHINERY  
FRICTION CLUTCHES**  
THE MOORE & WHITE CO.  
157 & LEHIGH AVENUE  
PHILA. PA.

(ESTABLISHED 1854.)

## A. & F. BROWN,

Engineers, Founders and Machinists.

**SHAFTING,  
PULLEYS, HANGERS, ETC.  
FRICTION CLUTCHES.**

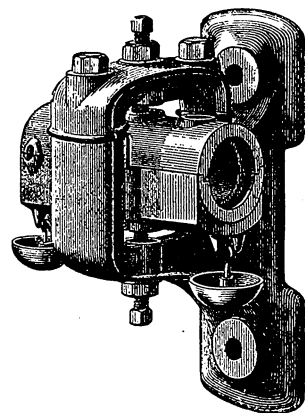
Estimates and Plans furnished for transmitting power by  
**HORIZONTAL AND VERTICAL SHAFTING**  
Also for erecting same.

**STEAM SIRENS**

—FOR—

Lighthouse, Steamship, Factory and Fire Signals.  
SEND FOR CATALOGUE.

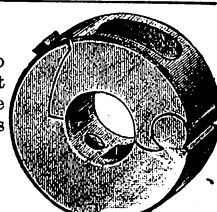
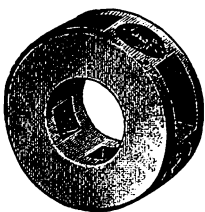
17 DEY ST., - - - NEW YORK.



## A SPLIT COLLAR

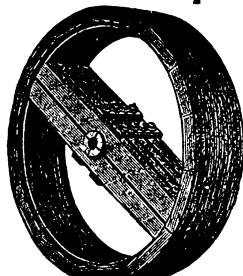
that may be put upon a shaft in a space equal to its length, and that has no projecting Bolts or Set Screw Heads is the correct thing. That is the kind our "GIANT" is. Price list and discounts on application.

THE GOUVERNEUR MACHINE CO.,  
Gouverneur, N. Y.



## Wood Split Pulley.

**Strongest,  
Lightest,  
Simplest,  
Cheapest**



**REEVES PULLEY CO.,**  
1220 E. 7th Street, - COLUMBUS, IND.  
New York Agents,  
Patterson, Gottfried & Hunter, 146-150 Centre St.

Wood split pulley in the world. Satisfaction guaranteed. Write for price-list and descriptive Catalogue. Address

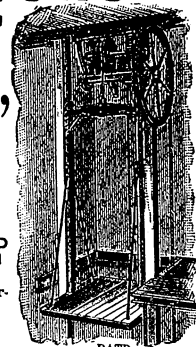
## ELEVATORS —

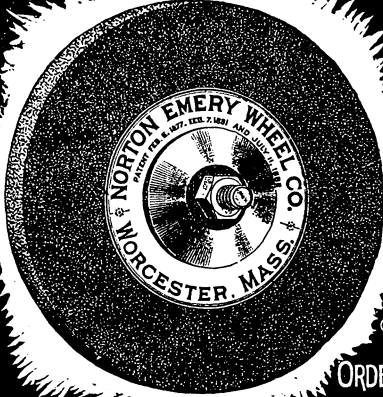
Hand and Belt Power.

## 'VARIETY'

HAND ELEVATOR  
HAS  
AUTOMATIC CLUTCH,  
ROLLER BEARINGS,  
MACHINERY FASTENED  
TOGETHER IN IRON  
FRAME.

Prices on any machine furnished on application to  
**Variety Machine Co.,**  
WARSAW, N. Y.





Send to  
**NORTON EMERY WHEEL CO.**  
 WORCESTER, MASS.  
 FOR ILLUSTRATED CATALOGUE OF  
**EMERY & CORUNDUM WHEELS.**  
**Emery Wheel Machinery** ETC.  
 ORDERS SOLICITED FOR NEW & EXPERIMENTAL WORK.

## ELECTRO-DEPOSITION OF METALS.

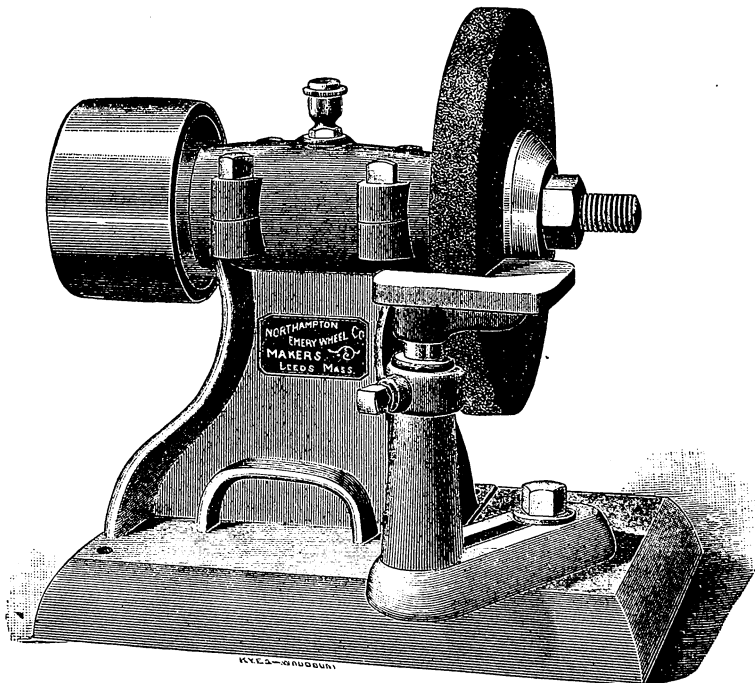
Comprising Electro-plating and Galvanoplastic Operations, the Deposition of Metals by the Contact and Immersion Processes, the Coloring of Metals, the Methods of Grinding and Polishing, as well as Descriptions of the Electric Elements, Dynamo-Electric Machines, Thermo-piles, and of the Materials and Processes used in every Department of the Art.

Translated from the German of DR. GEORGE LANGBEIN, with additions by WILLIAM T. BRANNT.

Second Edition, Revised and Enlarged. Illustrated by One Hundred and Thirty-eight Engravings. 458 Pages. Price, \$4.00.

—SENT POST-PAID, ON RECEIPT OF PRICE BY—

**DAVID WILLIAMS.** Publisher and Bookseller, 96-102 Reade Street, New York.

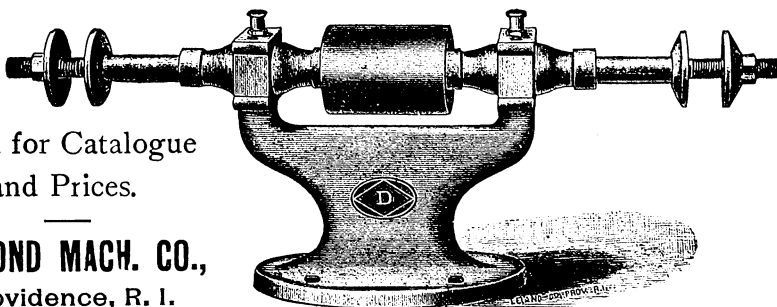


**Northampton Emery Wheel Co.,**

Leeds, Mass., and 20 So. Canal St., Chicago, Ill.

## POLISHING LATHE No. 3.

STEEL SPINDLE 52 INCHES LONG, 1 1/4 INCHES DIAMETER.



Send for Catalogue  
and Prices.

**DIAMOND MACH. CO.,**  
Providence, R. I.

## Lathe Tool for Truing Emery Wheels of all Shapes

The Bennett Tool, with conical cutter, has been in use for years. It is the only tool ever used successfully on any shape of wheels. No modern machinist should be without it. Manufactured by

**BAY STATE STAMPING CO.,** Worcester, Mass.

D

## NOW IS THE TIME TO BUY SCYTHE STONES.

We are sole manufacturers of the celebrated brands. Western Red End, Star, Diamond, Clear Grit, Blue Bank and Quinnebog.

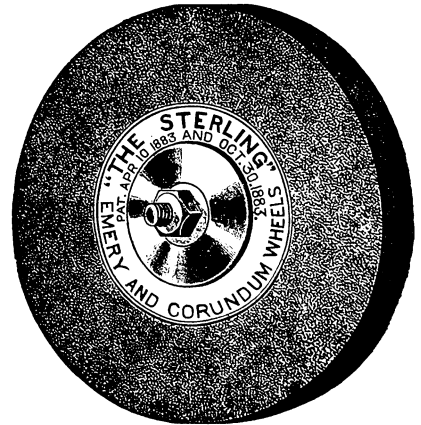
Write for Catalogue C.

**The Cleveland Stone Co.**  
CLEVELAND, O.

Sterling Emery Wheel Company, 174 Fulton St., N. Y.

FACTORIES:

Tiffin, Ohio, and West Sterling, Mass.



Send for new  
Catalogue  
or  
specialties.

**ALFRED BOX CO.,**  
Front, Poplar and Canal Sts  
Philadelphia, Pa.

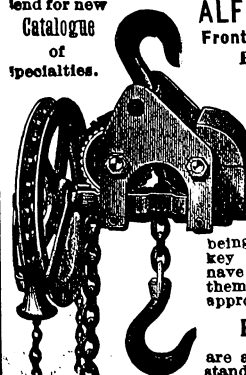
Manufacturers of  
Box's Pat. Double

**Screw Hoist**  
13,000 lbs. in use.

Many have done hard continuous duty 5 years without a single part being renewed. This is the key of our success. They have built up a reputation themselves that cannot be approached. Our improved

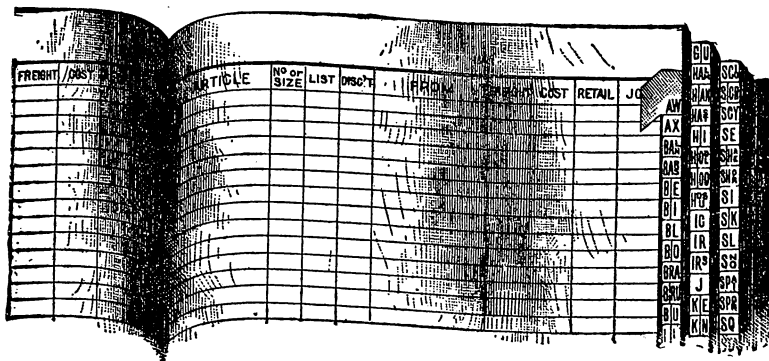
**Radial Drills**

are also assuming the same standard.



# The Iron Age Hardware Price Book E.

SECOND EDITION, REVISED AND ENLARGED, WITH MULTIPLE INDEX (Patent Pending).



AD GU SC  
AN HA SCR  
AU HAN SCY  
AW HA SE  
AX HI SHA  
BA HO SH  
BA HO SI  
BE HO SK

Fac-Simile of Indexing.

**SIZE.**—The book is 7 x 10 inches (much larger than Price Books A, B, C, or D), 350 pages.

**PAPER.**—The paper is the celebrated Crane's heavy ledger paper, tough and strong, permitting frequent changes and erasures.

**BINDING.**—The binding is of the very best quality—flexible seal grained leather.

**INDEX.**—By means of the arrangement shown in the cut the index applies to every page (except Supplement) and permits reference to any article at a single motion. This greatly facilitates the use of the book, avoiding the troublesome turning from page to page which is necessary in connection with other Price Books. It has been prepared with great care, and it is believed that it provides a place for every article in the Hardware line.

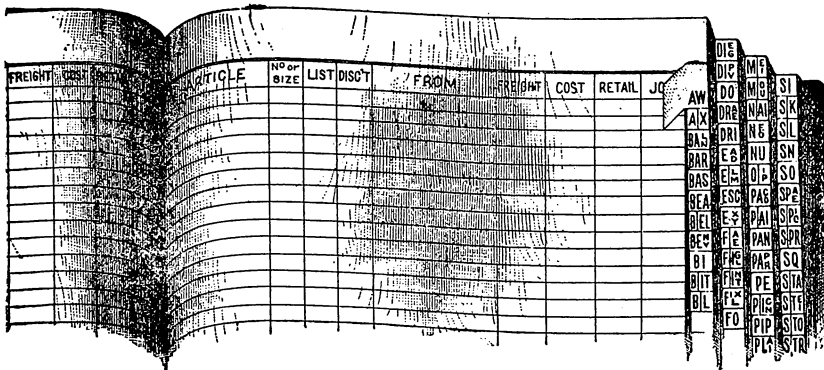
**ARRANGEMENT.**—The book is arranged to keep a complete record of prices on a single page, the width giving sufficient room.

**SUPPLEMENT.**—A 40-page Supplement is provided to give room for supplemental quotations, memoranda, tables, &c.

**THIS BOOK IS ISSUED IN ONLY ONE EDITION, PRICE, \$5.00.**

# The Iron Age Hardware Price Book F.

WITH MULTIPLE INDEX (Patent Pending).



AD DI MF SI  
AN DI MO SK  
AU DO NAI SL  
AW DR NE SN  
AX DRI NU SO  
BA ED OP SP  
BAR EM PA SP  
BAS ESC PAI SPR

Fac-Simile of Indexing.

**SIZE.**—The book is 8 1/4 x 11 inches (much larger than Price Books A, B, C, D or E), 556 pages.

**PAPER.**—The paper is the celebrated Crane's heavy ledger paper, tough and strong, permitting frequent changes and erasures.

**BINDING.**—The binding is of the very best quality—flexible seal grained leather.

**INDEX.**—By means of the arrangement shown in the cut the four rows of index applies to every page (except Supplement) and permits reference to any article at a single motion. This greatly facilitates the use of the book, avoiding the troublesome turning from page to page which is necessary in connection with other Price Books. It has been prepared with great care, and it is believed that it provides a place for every article in the Hardware line, and gives ample space for recording prices.

Sufficient space has been provided for large lines of goods such as Axes, Bits, Springs, etc., by allowing four pages to such indices, instead of two pages, as for lines of goods requiring less space. This is accomplished, as in AX for example, in Book F by having a short tab with the letter A on the tab on the first leaf, and AX on the tab on the second leaf. The A on the first leaf is directly over the A on the lower leaf, so that the index reads AX whether looking at both leaves together, or at the lower one only.

The four rows of index tabs are printed in gold letters on black Russia leather. The tabs are securely fastened on both sides of each page, making a handsome and durable index.

**ARRANGEMENT.**—The book is arranged to keep a complete record of prices on a single page, the width giving sufficient room.

**SUPPLEMENT.**—An 80-page Supplement is provided to give room for supplemental quotations, memoranda, tables, &c.

**THIS BOOK IS ISSUED IN ONLY ONE EDITION, PRICE, \$7.50.**

## Advantages of Multiple Index Price Book.

A SPECIAL feature of the books is the arrangement of the index characters, which, instead of being alphabetical, are arranged with special reference to the classification of Hardware goods, each index character giving the first two or three letters of the names of Hardware articles as shown above. The ease and convenience with which the books can be used is indicated in the following examples, taken from Book F:

For Augers, turn to	AU	For Chisels, turn to	CH	For Iron, turn to	IRO
" Parers, Apple "	PAP	" Cutlery, "	CUT	" Irons, "	IR'S
" Saws, "	SAW	" Cartridges, "	CAR	" Shovels, "	SHO
" Pumps, "	PUM	" Rules, "	RUP	" Grindstones, "	GRI
" Bits, "	BIT	" Locks, "	LO	" Stones, "	STO

Special care has been taken to make the classification as indicated in the index correct and comprehensive, making provision for all Hardware articles and giving sufficient space for the keeping and recording of prices. It is thought that every strictly Hardware article has its first two or three letters given, thus permitting immediate reference to it by a single motion.

It is, however, obvious if any articles are not directly designated by the index characters, that the index, being alphabetical in its arrangement, indicates the place where quotations on such articles should be recorded. The supplement, however, may be found useful for quotations on any outside goods which the Hardwareman may desire to keep prices on, while at the same time it may be used if necessary for any overflow of matter from the preceding pages, or to contain list prices or other matter relating to goods.

**Hardware Classification.**—A pamphlet containing a classification of the leading Hardware articles is furnished with the price books. **Standard Lists.**—In connection with these price books a set of *The Iron Age* STANDARD HARDWARE LISTS can be used with great advantage. Price 25 cents.

These price books, which have been prepared by R. R. Williams, Hardware Editor of *The Iron Age*, are presented to the attention of Hardware men in the confidence that they will be found a most valuable aid in keeping track of prices.

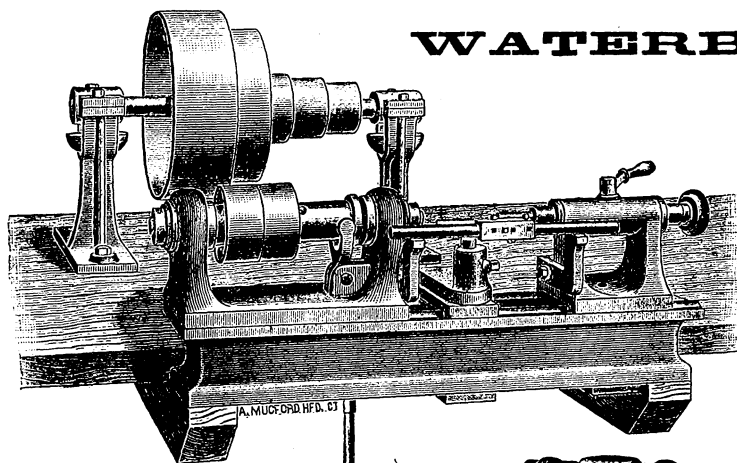
Sent, Post-paid, on Receipt of Price, by

DAVID WILLIAMS, Publisher, - 96-102 Reade St., New York.

# THE E. J. MANVILLE MACHINE CO.,

MANUFACTURERS,

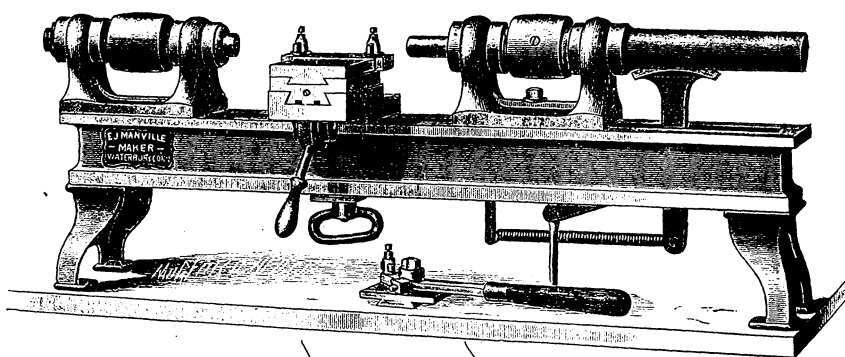
WATERBURY, CONN.



CLOCK LATHE.

SPECIAL  
AUTOMATIC  
MACHINES.

POWER PRESSES.

WIRE WORKING  
MACHINES.

EDGING LATHE.

Built in a strictly first-class manner and in two sizes, either of which is capable of performing a great variety of work, such as trimming, knurling, etc.

## A Boring and Turning Mill

Did you ever notice that a Mill can do more work than a Lathe?

We have a variety of sizes, with regular and special heads.

### Bridgeport Machine Tool Works,

E. P. BULLARD, Prop., Bridgeport, Conn.

NEW YORK OFFICE, 145 BROADWAY AND 86 LIBERTY ST.

## IDEAS

On Saving Cost of Production  
in Our New

### CATALOGUE "C,"

JUST OUT.

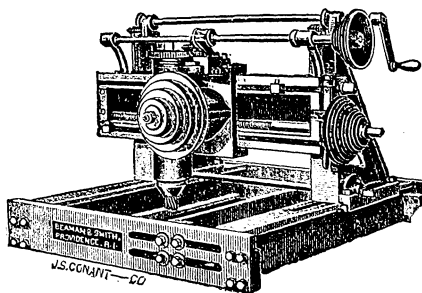
SEND FOR IT.

**BEAMAN & SMITH,**  
PROVIDENCE, R. I.

FOR NUMBERING AND LABELING  
Boxes, Drawers and Shelves  
In Hardware Stores and Factories.

Send for sample and description of our Handy Box of small gummed Letters and Figures, intended for labeling shelf boxes. Put up especially for the Hardware trade.

**THE TABLET AND TICKET CO., Mfrs.,**  
87-89 Franklin St., Chicago. 99 Franklin St., New York.



Locomotive Cylinder Port Milling Machine.

**WILLSON'S  
PAPER  
LETTERS**

## EXTRA!!!

Attention given to the design and manufacture of automatic machines for any purpose. Write to us if you have an idea the machines for your work can be improved. We will do our best to develop your ideas. Estimates on all classes of machine work.

*The L. E. Rhodes Co.,*

Hartford, Conn.

## SPECIAL

And Automatic Machinery and Tools for reducing cost of manufacturing machines, parts of machines, articles of hardware, &c., designed and built. Tools, models and experimental work. Estimates given. Correspondence solicited.

**IDEAL MACHINE WORKS,**

P. O. Box 655 Hartford, Conn.



**J. Popping's**  
Patent Machine  
and Tool Wks.

MANUFACTURERS OF

Solid Iron Shoulder Rabbet Planes, etc., etc., and Hofstatter's Patent Hair Picking Machine.

N. E. Cor. 58th St. and 11th Ave., N. Y.



**The Scattergood**

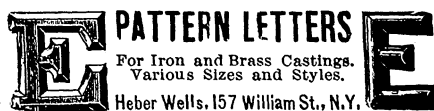
Time Record and

Pay Roll Book.

(Pat. Oct. 13, 1891.)

Address for Circular to

**HENRY W. SCATTERGOOD,**  
23 Richmond St., Phila., Pa.



For Iron and Brass Castings.  
Various Sizes and Styles.  
Heber Wells, 157 William St., N.Y.



## Closing Out Sale

Of the Entire Equipment of a  
Large Machine Works in  
New York City.

The MACHINE TOOLS are specially adapted for FINE ACCURATE WORK—they are of the LATEST IMPROVED PATTERNS, PRACTICALLY GOOD AS NEW and will BE SOLD VERY LOW BEFORE REMOVAL.

Brown & Sharpe No. 1 Universal Milling Machine with arm and all attachments.  
Universal Grinding Machine with all attachments.  
Garvin No. 1 Hand Milling Machine.  
Pratt & Whitney No. 2 Screw Machine with wire feed complete.  
Putnam Engine Lathe, 21 in. x 10 ft.  
Reed Engine Lathe, 14 in. x 6 ft., with Taper attachment and Chuck.  
Pratt & Whitney Engine Lathe, 13 in. x 4 ft., with Taper.  
Reed Engine Lathe, 13 in. x 5 ft., with Chuck.  
Prentice Hand Lathe, 10 in. x 4 ft.  
Gould & Eberhardt 12 in. Crank Shaper.  
Pratt & Whitney Planer, 20 in. x 6 ft.  
Stiles Standard Presses, Nos. 0, 1 and 3.  
Stiles Large Open Back Adjustable Press, weight, 4300 lbs.  
Water Tool Grinders, Forge, Anvil, Shafting, &c.

**J. J. McCabe,**

14 Dey Street, - New York,  
Successor to E. P. BULLARD'S N. Y. Machinery Warerooms.

**New and Second-Hand Machinery.**

1 Schrimmer Wood Carver. Nearly new.  
1 28 1/2 in. Lefell Water Wheel. Second-hand.  
2 36 in.  
1 Eureka Smutter. Nearly new.  
1 No 3 Diamond Water Grinder. New.  
1 No. 2  
1 H. B. Smith Blind Slat Tenoner. Second-hand.  
1 20 in. Clement Pony Planer. Second-hand.  
1 24 in. " Buzz  
1 30 in. " Gauge Lathe. "  
1 Two Spindle Graham Shaper. "  
2 13 in. x 7 ft. Sebastian Lathe. New.  
2 15 in. x 7 ft. "  
10 Wood Frame Saw Tables. Second-hand.  
1 Knapp Dovetailing Machine. Second-hand.  
1 Rowley & Hermance Three Sided Molder. Second-hand.  
1 Clement Rod and Dowel Machine. Second-hand.  
1 Clement Dado Machine. Second-hand.  
1 H. B. Smith Jointed Sander. Second-hand.  
1 Clement Vertical Boring Machine. Second-hand.  
1 Clement Boring and Bit Mortising Machine. Second-hand.  
1 Large Gas Furnace. Second-hand.  
1 35 in. Exhaust Fan. Second-hand.  
1 72 in. Fan Blower, Sturtevant. Second-hand.  
1 Clement Chair Round Machine. Second-hand.  
1 24 in. Pony Planer. Second-hand.  
This list will be changed each week.

**W. P. DAVIS,**

Rochester, N. Y.

Planer, 29" x 27", planes 7'. Good order.....\$325.00  
20" B'k G'd Rebuilt Drill Press, self feed.....135.00  
24" New Shaper, heavy and accurate.....255.00  
No. 1 Dallett Portable Drill. Good as new.....90.00  
38" Bk. Gd. Drill, heavy. Good as new .....275.00  
Lathe 24" x 12", Chuck, Tools, used 30 days.....350.00  
Forging Drop, 100 lb. Hammer, New Design.....160.00  
Bolt Cutter, Head and Dies, New, 3/4 to 1 1/2" .....75.00  
Power Punch Presses.....\$75.00 and upward.  
**AMER. TOOL WORKS, Cleveland, O.**

### FOR SALE.

Ball Electric Light Engine, 13 in. x 12 in., 100 H. P.  
F. McSWEGAN & SONS,  
Dover St. and Franklin Square, N. Y.

## WANTED. TO PURCHASE FOR CASH.

Engines, Boilers, Pumps, Lathes, Planers, Drill Presses, Shapers, Steam Hammers, Boring and Milling Machines, Boiler Rolls, Band Saws, Jig Saws, Pony Planers, Joiners, Mortisers, &c.

We would purchase complete plants without the Real Estate, such as Machine Shops, Boiler Shops, Wood Working Establishments, Electric Light Stations, &c.

Write us for whatever you have to sell.

**L. F. SEYFERT'S SONS,**  
437-441 N. 3d St., Philadelphia, Pa.

## FOR SALE.

3 Steam Shovels.  
7 Locomotives, Standard and Narrow.  
27 Cars, 2 and 3 feet gauge.  
11 Hoisting Engines.  
27 Steam and Centrifugal Pumps.  
5 Iron Planers.  
Engines and Boilers.

**THOMAS CARLIN'S SONS,**  
Allegheny, Pa.

### SECOND HAND MACHINERY.

#### ENGINE LATHES.

8 in. x 3 ft. Sebastian May. Foot Power.  
14 in. x 6 ft. Prentice Bros. Rise and Fall.  
15 in. x 6 ft. Prentice Bros. Rise and Fall and Taper.  
1 14 in. x 6 and 8 ft. Fitchburg. Rise and Fall.  
17 in. x 6 ft. Ames. Rise and Fall.  
24 in. x 36 in. x 10 ft. New Haven. Plain Glib.  
24 in. x 36 in. x 13 ft. Gould. Plain Glib.  
20 in. x 12 ft. Ames. Compound Rest.  
37 in. x 10 ft. Fidelity. Compound Rest.  
74 in. x 12 ft. Welsh. Plain Glib.

#### PLANERS.

15 in. x 12 in. x 3 ft. New Haven.  
16 in. x 16 in. x 12 in. Belden. (Crank).  
16 in. x 16 in. x 3 ft. Pratt & Whitney.  
18 in. x 18 in. x 4 ft. Putnam Planer.  
22 in. x 20 in. x 5 ft. Putnam Planer.  
25 in. x 25 in. x 5 1/2 ft. Huebner. (Screw).  
36 in. x 34 in. x 13 1/2 ft. L. W. Pond.  
51 in. x 45 in. x 15 1/2 ft. New Haven.  
61 in. x 54 in. x 9 ft. 10 in. Betts.

#### SHAPERS.

6 in. Crank. Boynton & Plummer.  
11 in. Crank. Bement.  
12 in. Friction. Hendey.  
13 1/2 in. Crank. Trav. Head. Fitchburg.  
15 in. Friction. Prentiss.

### PRENTISS TOOL & SUPPLY CO.,

115 Liberty Street, New York, 59 South Canal Street, Chicago, Ill.

## R. S. V. P.

1 28 x 8 New Haven Lathe.  
3 24 x 12 Lathes, S. C. without changing gears.  
1 each 22 in. and 24 in. x 12 ft. Standard.  
1 each 21 in. x 8 ft. and 11 ft. Lodge & Davis.  
1 19 x 6 ft. Pratt & Whitney.  
1 18 x 6 Lodge & Davis "Tool Room."  
3 each 12 in. and 15 in. Brass Fin. Turret Lathes.  
1 12 in. x 4 Hand Lathe.  
1 30 in. Henley Pulley Lathe.  
1 20 in. Triple Geared Shaper.  
1 26 in. Triple Geared Shaper.  
1 Gear Cutter, will cut up to 40 in.  
1 each No. 2 and No. 4 Garvin Milling Machines.  
1 Pratt & Whitney Lincoln Miller No. 3.  
1 each 52 in., 80 in. and 120 in. Radial Drill sec'd h'd.  
1 26 in. Drill.  
1 24 in. B. G. P. F. Drill.  
1 20 in. W. & L. Drill.  
1 each "N. & J." Sensitive Drills, Nos. 1 and 3.  
1 Universal Saw Bench.  
A full line of Engine Lathes, Turret Lathes, Pulley Machinery, also Motor Gear, Cylinder Boring and Triple Facing Machines.

**THE LODGE & SHIPLEY MACHINE TOOL CO.,**  
Cincinnati, Ohio.

### FOR SALE.

One second-hand four flued Boiler size 38 inches in diameter, 18 feet long, in good condition, with stack and breeching. Price \$80 cash. f.o.b. cars, New Castle. Must be sold for want of use and storage. Address VULCAN IRON COMPANY, Ltd. New Castle, Pa.

FOR

# MACHINERY

ADDRESS US.

Pennsylvania Mch. Co., Ltd.,  
PHILADELPHIA, PA.

### MACHINERY BARGAINS.

10 in. Post Drill.	16 in. x 5, 6, 7 and 10 ft. Eng. Lathe.
10 in. Post Drill, Auto Feed to Table for But Drilling.	18 in. x 6, 7 and 8 ft. Eng. Lathe.
1, 2 and 3 Spindle Sensitive, with and without Power Feed.	20 in. x 5, 6, 7, 8 and 10 ft. Eng. Lathe.
2, 3 and 4 Spindle Gang Drills.	21 in. x 10 and 13 1/2 ft. Eng. Lathe.
20, 24, 28, 30 and 44 in. Drills.	24 in. x 10 ft. Eng. Lathe.
60 in. Swing Post Drill.	25 in. x 16 and 24 ft. Eng. Lathe.
5 ft. Arm Radial Drill.	26 in. x 10 1/2 ft. Eng. Lathe.
12 in. Stroke, 16 in. x 16 in. Crank Planer.	32 " 16 " "
16 in. x 4 ft. Planer.	35 " 13 " "
24 " 4, 5 and 6 ft. Planer.	37 in. Double Head Driving Wheel Lathe.
28 " 5 and 8 " "	Bement Car Axle Lathe.
30 " 5, 8 and 10 " "	1/4 and 2 in. Bolt Cutter, Schenk's.
60 " 20 " "	7 Spd Nut Tapper, Dunel.
72 " 25 " "	2 Spd Profiler, No. 1, P. & W.
9, 12, 14, 24 and 26 in. Stroke Shaper.	No. 1, 2 and 2 1/2 Screw Maches, P. & W.
10 in. Stroke Slotter.	No. 1 Lincoln Pattern Miller.
Hyd. Riveting Machine.	Hand Millers, Screw Slotters, Mill and Cutter Grinders.
" Crane, Both A1.	
Punch and Shear.	
Plate Planer.	
11 in. x 6 ft. Eng. Lathe.	
14 " 6 " "	
15 " 6 and 8 ft. Engine Lathe.	

Lot of Miscellaneous Machinery, Engines, etc. Send for Latest List.

**GEO. PLACE MACHINE CO.,**  
Offices: 145 Broadway and 86 Liberty St.  
Warehouse: 511 and 513 West 13th Street, NEW YORK.

## TWO 50 HORSE VERTICAL BOILERS.

Diameter, 54 in.  
Height of Boiler, 9 ft.  
Diameter of Furnace, 48 in.  
Shell (Thickness), 5-16 in.  
Heads " 3-8 in.  
Furnace Plate, No. 2 iron.  
No. 2 in. Tubes, 201.  
Complete with Base, Grates and Hood and all small fittings.  
In use three months. In fine condition.

**THE SCRANTON SUPPLY & MACHINERY CO.,**  
SCRANTON, PA.

## FOR SALE.

2 Double Deck Boilers about 40 H.-P. each, cheap. Hoisting Engine. Cylinder Boilers for Stacks, 30, 36 and 42 in. diameter. Round and Square Iron Tanks. Blow Offs. 5 Brass Cannons about 1400 or 1500 pounds each. Good order. All kinds of Scrap Iron and Metals on hand.

**BUSSENIUS & CUNLIFFE,**  
12th and Washington Ave. Philadelphia.

## For Sale Cheap.

### Special lot of NEW ENGINE LATHES

13 in. x 5 ft.	17 in. x any length bed.
15 in. x 6 ft.	27 in. x any length bed.
27 in. x 12 ft.	30 in. x any length bed.
32 in. x 12 ft.	32 in. x any length bed.

ADDRESS

**Draper Machine Tool Co.,**

Successors to

**LATHE & MORSE TOOL CO.,**

140 Gold Street

WORCESTER, MASS.

### FOR SALE.

The following second-hand tools in good order:  
34 x 6 1/2 Lathe. Putnam Machine Co.  
50 in. double head Driving Wheel Lathe.  
26 in. Chucklag Machine. P. & W.  
Milling Machine, double column, double head, P. & W. Grant Pattern.  
Two 3 Spindle Drills, P. & W.

**BRIDGEPORT MACHINE TOOL WORKS,**  
E. P. BULLARD, Prop., Bridgeport, Conn.  
N. Y. Office: 145 Broadway and 86 Liberty St.



We have just published a list  
of over

## 100 pieces of Machinery

OF DIFFERENT KINDS,

consisting of Lathes, Planers,  
etc. If you are in the market  
for any tools of this nature  
write us for circular.

**HILL, CLARKE & CO.,**

156 Oliver St., Boston, Mass.

12 and 14 South Canal St., Chicago, Ill.

### SECOND-HAND MACHINERY.

1 Iron Planer 60 in. x 60 in. x 20 ft., 2 heads on Cross Rail.  
1 Iron Planer 34 in. x 26 in. x 7 ft. 1 30 in. x 30 in. x 8 ft.  
1 Iron Planer 24 in. x 24 in. x 4 ft. 1 32 in. x 25 in. x 6 ft. 6 in.  
1 Iron Planer 16 in. x 12 in. x 3 ft. 1 20 in. x 20 in. x 5 ft.  
1 Engine Lathe 60 in. x 18 1/4 ft. New. Bargain.  
1 Engine Lathe 24 ft. bed, 54 in. swing, D. W. Pond make, A1.  
1 Engine Lathe 41 in. x 14 ft., New Haven make, A1.  
1 Engine Lathe 48 in. x 16 ft., raised to 60 in., Putnam make.  
1 Engine Lathe 34 in. x 8 ft., Putnam.  
1 Engine Lathe 36 in. x 14 ft., Putnam make.  
1 " " 26 in. x 10 ft., D. W. Pond make.  
1 " " 2 in. x 25 ft. 6 in., A1. 1 28 in. x 14 in., New Haven.  
1 Engine Lathe 20 in. x 12 ft., New Haven. 1 18 in. x 8 ft., New Haven.  
1 Drilling Machine 40 in., B. G. S. F. 1 36 in., B. G. S. F., both New Haven.  
1 5 in. x 10 in. Eureka Steam Hammer, A1.  
All kinds of Iron and Wood Working Machinery.  
Lists sent. NEW YORK MACHINERY DEPOT,  
Office 178 Broadway, N. Y.

## FOR SALE.

The Following Second-Hand.

## MACHINERY.

One Bickford Boring Mill.  
Four Craig Ridgway Steam-Hydraulic Cranes, good as new.  
One Iron Lattice Work Platform for Cupola.  
One 7 ton Cupola and Stack.  
One 3 ton Cupola and Stack.  
One Converter Stack.  
Three Converter Bottoms.  
Five 3 ton Ladles.  
Four Hand Boom Cranes.  
One Worthington Pump, 12 x 8 1/2 x 10.  
One Sturtevant Blower No. 8, with Engine attached.  
One Sturtevant Blower No. 5.  
One Blake Air Compressor, 6 x 5 x 7.  
One Blowing Engine, Steam Cylinder 28 in., Air 48 in.  
Two Wire Rope Transmission Wheels, 75 in. in diameter.  
One 30 H. P. Horizontal Engine.  
One No. 3 Springfield Gas Machine.  
Five Pneumatic Air Hoists, good as new.  
For particulars apply to  
MANNING, MAXWELL & MOORE,  
111 & 113 Liberty St., New York.

### FOR SALE.

Lathe, 52 in. swing, 40 ft. long, triple geared.  
New Steam Engines, 16 x 24, 14 x 24, 12 x 24, 6 x 12.  
Rebuilt Engines, 14 x 24, one pair 4 x 8.  
Five hundred iron pulleys 10 ft. dia. and less.  
WM. A. BOLE, Trustee,  
25th St., Cor. Liberty Ave., Pittsburgh, Pa.

## Second-Hand Channels FOR SALE VERY CHEAP.

A lot of about 250 tons, 9 inch Steel Channels, running 10 to 20 feet in length.  
Also lot of Iron Channels, 3 to 12 inches, 10 to 25 feet long. Will sell lot or in parts. All in first-class condition.  
BLOCK POLLAK IRON CO.,  
69 Commerce Building, Chicago, Ill

## 30-lb. Iron Rails.

I offer for prompt sale 1200 tons 30-lb. Iron Rails with splice bars, switches and frogs. In good order for relaying. Located in Western New York. Also a lot of standard and narrow gauge locomotives. Send for details and prices.

**THOS. P. CONARD,**

206 Walnut Place, Philadelphia.

## FOR SALE. SECOND-HAND ENGINES.

38 x 48 Corliss.	18 x 48 Corliss.
28 x 60 "	18 x 36 "
26 x 60 "	16 x 32 Fitchburg.
20 x 48 "	12 x 36 Corliss.
22 x 42 Wright.	10 x 24 "

MARVIN BRIGGS, 12 Broadway, N. Y.

## ICE MACHINES

FOR SALE.

## 2 LINDE MACHINES,

Capacity, 15 tons ice each and double that capacity as refrigerators.

MARVIN BRIGGS, 12 Broadway, N. Y.

DOUBLE CORLISS CONDENSING ENGINE, 600 H. P., One 15 inch by 42 inch Corliss Engine, 125 H. P., Double Automatic Engine, 350 H. P., two 100 H. P. Phoenix Automatic Compound Engines, 45 and 5 H. P., Westinghouse Engine, one 80 H. P. Beck Engine, one 7 x 7 Southwark Automatic Engine, one 4 H. P. Otto Gas Engine, 100, 200, 300 and 500 H. P. Feed Water Heaters, 30 to 100 H. P. Return Tubulars, 70 H. P. Locomotives, 60 H. P. Vertical Boilers, good for 100 pounds.

FRANK TOOMEY, Office 131 N. 3d St. Ware houses—974 to 980 Breach Street, 159 to 161 Canal Street, Philadelphia.

## SECOND-HAND RAILS FOR SALE.

In lots to suit and ready for shipment.

50 tons 20 lb. Iron T Rails.  
150 tons 25 lb. Iron T Rails.  
210 tons 30 lb. Steel T Rails.  
120 tons 30 lb. Iron T Rails.  
300 tons 35 lb. Iron T Rails.  
250 tons 50 lb. Steel T Rails.  
400 tons 54 lb Steel T Rails.  
1700 tons 60 lb. Steel T Rails.  
2200 tons 62 lb. Steel T Rails.  
900 tons 70 lb New Seconds Steel.  
800 tons Johnson Girder Rails, 38, 47 and 52 lb.  
All in excellent condition and selected. Sound Rails of all sizes cut to specified lengths for builders' use, foundations, vaults, kilns, &c. Apply to

JOSEPH JEWKES, Steel Rails,  
Pittsburgh, Pa.

## AT ALL TIMES

we have on hand Steam Pumps, Second-hand and New. Every Second-hand pump is tested and guaranteed before leaving shop. Write us for information, also for catalogue, circulars, prices, etc., of the celebrated "Hooker Patent Steam Pump," which we manufacture.

HOOKER-COLVILLE STEAM PUMP CO.,  
St. Louis, Mo.

### SOME BARGAINS HERE.

1 Hendey Shaper, 15 in. stroke, imp. vise.  
1 14 x 6 Screw Cutting Engine Lathe. New.  
Pattern Makers' Speed Lathe. 7 ft. Bed, \$40. New.  
2 1/2 Hendey Cutting-off Machine. New.  
44 in. C. & D. Resaw. Fine condition.  
Radial Drill, 5 1/2 ft. arm.  
Axle Cutting-off Machine, Double Head, cut 3/4 dia.  
Quantity 2d hand Dodge Pulleys. Cheap.  
Safety Construction Company's combined Trap and Pump.  
And other machinery, new and second hand. Write for prices.  
Machinery Supply Company,  
39, 41 and 43 Central Ave., Rochester, N. Y.

## A LARGE ADDITION TO OUR STOCK OF CORLISS ENGINES.

Also HIGH SPEED, Etc.

—SEND FOR CATALOGUE.—

Corliss—26 x 48, 28 x 30, 30 x 72, 10 x 20. Several large sizes guaranteed, viz.: 18 x 48, 23 x 48, 28 x 48, 30 x 48, 26 x 60. Many other sizes on hand. Porter-Allen 11 x 16 and other High Speeds. An assortment of Horizontal Tubular Boilers. Large Duplex Fire Pump, Brennan Crusher, Platform Scales, Burr Mill, Bogardus Mill, etc., etc.

G. M. CLAPP, 74 Cortland St., N. Y.

## SECOND-HAND MACHINE TOOLS.

### ENGINE LATHES.

18 in. Putnam Traverse Head.  
13 in. x 6 ft. Phenix.  
15 in. x 6 ft. Blaisdel.  
15 in. x 8 ft. Fitchburg.  
10 in. x 6 ft. Perkins.  
10 in. x 7 ft. Bement.  
10 in. x 8 ft. Perkins, Taper.  
18 in. x 6 ft. New Haven.  
16 in. x 8 ft. Blaisdel.  
18 in. x 8 ft. Bradford.  
18 in. x 8 ft. Blaisdel.  
18 in. x 10 ft. "  
20 in. x 6 ft. Bullard.  
28 in. x 12 ft. Fiffeld.  
30 in. x 12 ft. Blaisdel.

### PLANERS.

20 in. x 20 in. x 5 ft. Ames.  
22 in. x 22 in. x 4 ft. L. W. Pond.  
24 in. x 24 in. x 6 ft. Whitcomb.  
24 in. x 24 in. x 5 ft. Putnam.  
28 in. x 28 in. x 7 ft. New Haven.

### SHAPERS.

10 in. Juengst Crank.  
10 in. Wood & Light Traverse Head.  
15 in. Kelly Crank.

Also a large number of other machines. Write for complete list and detailed description.

**THE GARVIN MACHINE CO.,**

Laight and Canal Sts., New York.  
Also 51 North 7th St., Philadelphia, Pa.

### !!! FOR SALE. !!!

BAKER BLOWERS, Nos. 3, 4, 5, 5 1/2, 7 and 7 1/2.  
ROOT BLOWERS, Nos. 1, 2, 3, 5, 6 and 7.  
CAMERON VACUUM PUMP, 16 in. x 20 in. x 24 in.  
KNOWLES PUMP, 14 in. x 10 in. x 12 in.  
NIAGARA PUMP, 9 in. x 5 in. x 10 in.  
1 No. 9 CLAYTON DUPLEX AIR COMPRESSOR, 22 in. x 24 in. x 30 in.  
Horizontal Boilers, 18 ft. x 6 ft., 7 ft. x 3 ft. Fixtures.  
Locomotive boilers, 20, 40 and 100 H. P.

Machinery Buyers write to  
C. R. BIGELOW, Machinery Expert,  
45 Dey St., New York City.

## FOR SALE.

SECOND-HAND.

ENGINES, Horizontal and Vertical. All types and sizes up to 2000 H. P.  
BOILERS, Vertical and Horizontal, and 3 Batteries of "Heine" water tube.  
MILLS, 3 high, 12 in., 20 in., 22 in., 30 in. and 36 in. 1 Reversing 32 in. Blooming Mill complete.  
STEAM HAMMERS. Various sizes up to 10 ton.  
SHEARS for Bars, Rails, Blooms and Plates.  
SQUEEZERS, ROLL LATHES, CRANES, GRINDING PANS, MACHINE SHOP TOOLS, &c.  
LOCOMOTIVES. Fine condition, various sizes and gauges.

"If you don't see what you want, ask for it" of

**B. M. EVERSON,**

301 Smithfield St., Pittsburgh, Pa.

## ALUMINUM GOODS

AND small CASTINGS in quantity to order. No goods for sale. All kinds of novelties made. If you are after information, enclose stamp. THE H. H. FRANKLIN MFG. CO., Syracuse, N. Y.

## RELAYERS FOR SALE.

200 Tons 60-lb. Steel

## RELAY RAILS

with splices. Also wanted second-hand equipment and scrap. Will purchase or handle on commission, as desired, cash advances made on consignments.

**G. H. SIBELL & CO.,**

Manhattan Building, Chicago.

### A FEW BARGAINS.

One "Yale" Traveling Crane, 10 ton cap. One 200 lbs. "Peck" Drop Hammer and Lifter. One Universal Milling Machine. One Polishing Rumbling Barrel, for liquid. Also Boilers, Engines and Flywheels.

**C. W. SCHULTZ & CO.,**

308 Walnut St., PHILADELPHIA.

**SECOND-HAND MACHINERY.****ENGINE LATHES.**

10 in., 11 in. and 13 in. Swing, 4 and 5 ft. Bed Lathes, Reed, Prentice and L. & M.  
15 in., 18 in., 18 in., 19 in. and 20 in. Swing, 6 and 8 ft. Bed Lathes, Dustin, Pond, Young, Fifeild and Bullard.  
24 in., 26 in., 28 in., 31 in. and 36 in. Swing, 10 ft., 16 ft. and 18 ft. Bed Lathes, Fifeild, Dustin, Blaisdell and Perkins.

**PLANERS.**

1 17 in. x 17 in. x 30 in. Hand Planer.  
1 16 in. x 18 in. x 3 ft. Crank Planer.  
1 17 in. x 17 in. x 3 ft. L. & M. Planer.  
1 20 in. x 20 in. x 4 ft. L. & M. Planer.  
1 24 in. x 24 in. x 6 ft. Pease Planer.  
1 27 in. x 27 in. x 5 ft. White Planer.  
1 60 in. x 60 in. x 22 ft. Heavy Planer with 4 heads.  
1 60 in. x 60 in. x 22 ft. Hepworth, 1 head.  
1 8 ft. Boring and Turning Mill with pulley attachment.

**DRILL PRESSES.**

2 20 in. Drill Presses, Prentice & Davis.  
1 20 in. x 36 in. Gap Lathe.  
3 Slate Drills, 1 one-spindle, 2 two-spindle.  
2 Pratt & Whitney 1 and 1/2 spindle.  
6 bench Drills.  
1 60 in. Heavy Geared Post Drill.  
1 each No. 2, 3 and 4 Garvin Gang Drills.

**SHAPERS.**

15 in. Stroke, Smith.  
15 in. G. & E. Make.  
17 in. and 24 in. Chase & Hendy.

**SPEED LATHES.**

10 in., 12 in. and 14 in. Swing, 3, 4 and 5 ft. Beds, Garvin and Spencer.

**ALSO LARGE STOCK NEW TOOLS.**

**THE NILES TOOL WORKS CO.**  
Eastern Branch, 136, 138 Liberty St., N. Y. City.

**RAILS FOR SALE.**

**NEW AND SECOND-HAND**  
Relaying rails of all sections. Second-hand **Cut Rails for Builders' Use.** Also a small second-hand Engine and Boiler for sale.

J. H. RICHARDSON & CO.,

Pittsburgh, Pa.

**SECOND-HAND MACHINERY FOR SALE.**

Planers, Drills and Lathes, good as new, for cash.

DIETZ, SCHUMACHER & CO.,

Cincinnati, O.

**FOR SALE.**

A 32 in. x 48 in. Vertical Engine, with 25 ton flywheel, 21 ft. diameter.

One pair 20 in. Pinion Housings.

Three sets 3 high 20 in. Roll Housings.

In complete working order. Address

PENCOYD IRON WORKS,

Philadelphia, Pa.

**FOR SPECIAL BARGAINS**

in second-hand Drop Presses, Power Presses, Dies and Tools for Sheet Metal Workers, also Boilers, Engines, both Portable and Stationary, Wood Working Machinery, etc., apply to

J. M. KRAMER & BRO., Machine Works,

Maria Stein, O.

**FOR SALE.**

A new iron building for immediate shipment, 81 ft. wide, 200 ft. long, consisting of a main span 61 ft. wide, with lean-to on one side 20 ft. wide. The trusses are sufficiently strong to carry a line of shafting and light jib crane. This building is suitable for a Machine Shop, Tin Plate Mill, Rolling Mill, etc. For further information address

SHIFFLER BRIDGE CO.,

Pittsburg, Pa.

**BIG BARGAINS.****Second-hand Machinery For Car Shops.**

1 36 in. 150 ton Hydraulic Wheel Press.  
1 Bement, Miles & Co. Single Axle Lathe.  
1 36 in. Bement, Miles & Co. Car Wheel Borer with Hand Crane.  
1 No. 6 J. A. Fay & Co. Car Mortiser and Borer.  
1 J. A. Fay & Co. Car Tenoning Machine.  
1 J. A. Fay & Co. No. 2 1/4 Pacific Planer and Matcher.  
1 J. A. Fay & Co. Universal Horizontal Car Borer.  
1 J. A. Fay & Co. No. 4 Tenoning Machine.  
1 Lane & Bodley Large Car Mortiser and Borer.  
1 1 inch Double National Bolt Cutter.  
1 J. A. Fay & Co. Vertical 3-Spindle Car Borer.  
Write for full list of new and second-hand Wood and Iron Working Machinery.

U. Baird Machinery Co.,  
Pittsburg, Pa.

**FOR SALE. CRANK and GEARED SHAPERS.**

Write us for Bargains.

J. STEPTOE & CO., Cincinnati, O.

**FOR SALE.****SECOND-HAND MACHINERY**

Nos. 1, 2, 5 and 6 Roots Blowers.  
9 in. x 9 in. Fitchburg Vertical Engine.  
54 in. x 9 ft. Vertical Boiler.  
H. P. Baxter Engine and Boiler.  
1 24 in. x 25 ft. bed Engine Lathe.  
1 1/4 to 1 1/2 in. open die Bolt Cutter.  
Low prices.

COOKE & CO.,

163 and 165 Washington St., New York.

**For Sale, Very Low for Cash.**

1000 tons relaying 60-lb. Steel T Rails, 500 tons relaying Steel Street Rails, side bearing, 35 to 47 lbs. sections. Also 3 tanks 7 1/2 ft. diameter, 10 ft. high.

WM. H. PERRY & CO., Providence, R. I.

**CHEAP HOISTING MACHINERY.**

**Double Cylinder Engine,**  
26 x 45 in. reversing gear, circular slide valves balanced throttle valve; direct acting drum 6 ft. 6 in. w. de. 7 ft. diameter; heavy fly wheel, complete and nearly new, and a most substantial outfit.

**Double Cylinder Engine,**  
8 x 16 inches, reversing gear, geared winding drum 6 ft. x 6 ft.

**Steam Piping,**  
complete. (About 176 ft.).

**Large Knowles Feed Pump,**  
Copper air chamber. Excellent condition.

**8 Hydraulic Automatic Jacks.**  
A number of good PULLEYS and SHEAVES, WIRE ROPE, &c., read; for use.

Wooden and Iron Tanks, Iron Hoisting Buckets, &c.

**Three Smoke Stacks,**  
with guy rods, nearly new.

**Boilers,**  
1 64 in. diam., about 16 ft. long, 16 in. flues.  
4 Cylinder type, 36 in. diam., about 30 ft. long.  
2 Cylinder type 48 in. diam., about 20 ft. long.

**Grate Bars, Doors, Frames, &c.,**  
complete and in good order.

**One Feed Water Heater**  
and connections, suitable for above outfit,  
Will be sold together or separately. For further information apply to

G. J. NEWTON & CO., Pottstown, Pa.

**FOR SALE CHEAP.**

A lot of Rolling Mill Machinery, Engines, 30-inch Plate Trains, Shears, Testing Machines, Cranes, Pumps, Electric Light Machines, Turbines, Blower, etc., etc. Full particulars by applying to

MATTHEW GILL, Jr.,

308 Walnut St., Phila., Pa.

**J. A. COLEMAN,**

Author Coleman's Mechanic's Liens in Illinois

Attorney at Law,

82 Hartford Building, Chicago.

MECHANIC'S LIENS EXCLUSIVELY



We can save you money on new or second-hand tools. Get our prices before buying.

**THE LODGE & DAVIS  
MACHINE TOOL CO.,**  
CINCINNATI, O., U. S. A.

**PITTSBURGH SALES AGENCY,**

J. H. HILLMAN, Manager,

**No. 8 Wood St.,  
Pittsburgh, Pa.,**

Offers for sale at very low prices **BESSEMER STEEL WORKS** and **STRUCTURAL STEEL MILLS**, also **STEEL MILL** for Rolling Bars and cold rolling, two **BLAST FURNACES**, a **RUSTLESS IRON WORKS**, interest in **TIN MILL** in INDIANA, **TUBE WORKS** and numerous other manufacturing interests and large quantity of very desirable **COAL PROPERTIES**, improved and unimproved.

**Dealers in Coal and Iron Lands.**

Examinations and Reports

on Properties.

References on Application.

**ROLLING MILL FOR SALE OR LEASE.**

Located in Chicago, within easy teaming distance of city warehouses and large consumers. Railroad facilities, first-class, connecting with every road entering the city. Well equipped, having one 10 in. and one 18 in. three-high train and an 18 in. muck train. Capacity, 75 tons a day. Mill can easily be adapted to specialties. Owners will take part pay in product. Address

CHICAGO FORGE & BOLT CO.,

20th St. and Stewart Ave., Chicago.

**WANTED.**

Machines for making double pointed tacks. Address, giving number, description and cash price,

THE PLYMOUTH MILLS,

Plymouth, Mass.

**WANTED.**

At once, about two miles more or less sixteen pound T rail. Apply to

GEORGE H. FERNALD,

Sanford, Fla.

**A BARGAIN.**

A fine business opportunity for a live business man or two partners who have \$25,000 to invest in a first-class, old, well established and well located jobbing and retail Hardware business, which did not lose money last year. Stock is well assorted. Good location in large Eastern City. Reasonable lease of premises can be continued. This will bear full investigation. Parties who can command above amount of capital address

"BARGAIN," Box 315,

office of The Iron Age, 96-102 Reade St., N. Y.

## FOR SALE.

Iron Foundry 85 by 150 feet, containing two (2) fifteen (15) ton steam cranes, one (1) five (5) ton hand crane, two (2) one (1) ton post cranes with hoists, two cupolas, capacity of forty (40) tons, two (2) core ovens, one (1) 18 in. by 18 in. upright engine with boiler, large assortment of wooden and iron flasks and a full line of patterns for engines, rolling mills, blast furnaces, etc., etc. Will sell same at a bargain. Address

**T. REED MCKNIGHT,**  
44 Penn Avenue, Pittsburgh, Pa.

## The Manufacturers

of first-class Anti-Friction Metal wishes to make permanent arrangements on commission basis with parties in position to sell same to Iron and Steel Rolling Mills, &c. Only those in position to command sales need apply. All applications treated confidentially. Apply

"A. F."

office of *The Iron Age*, 59 Dearborn St., Chicago.

## WANTED.

Slide Valve Engine, 125 to 150 H. P., also two Tubular Boilers, 52 in. diameter, 16 feet long and one Tubular Boiler, 48 in. diameter, 14 feet long. Give full particulars

**PEORIA COOPERAGE CO.,**  
Peoria, Ill.

## FOR SALE.

Planing Mill and Woodworking Plant doing a good business. On time, or will exchange for desirable real estate or stocks of merchandise. Plant in a beautiful town on the Lake Shore & Michigan Southern and N.Y.C. and St. L. Railroads, about 2½ miles from shore of Lake Erie. Address **COLUMBIAN NOVELTY CO.,** North East, Pa.

FOR SALE  
**HOISTING ENGINES**  
MANUFACTURED BY  
**THE JOHN F. BYERS MACHINE CO.**  
RAVENNA, OHIO.  
WRITE FOR CATALOGUE.

## WANTED.

Four No. 18 or 19 Bliss Power Presses. Address "W." office of *The Iron Age*, 96-102 Reade Street, New York.

## For Sale. ALMOST NEW.

6 ft. Pond Boring Machine.  
No. 1 Betts Horizontal Boring Machine.  
48 in. x 48 in. x 12 ft. Sellers Planer.  
39 in. x 9 ft. Harrington Engine Lathe.

**PHILADELPHIA MACHINERY & SUPPLY CO.,** 19 N. 7th St., Philadelphia.

## WANTED.

By a large manufacturing establishment some new specialty to make and sell to the Jobbing Hardware, Crockery or Grocery trade. Address

"NEW SPECIALTIES,"

office of *The Iron Age*, 96-102 Reade Street, New York.

## FOR SALE.

Manufacturing plant of light hardware, good line, established trade.

BOX 84,

office of *The Iron Age*, 59 Dearborn St., Chicago.

## FOR SALE.

A well established retail Hardware business. Located in a city, 150,000 inhabitants, Central New York. Stock consists of a general line Builders' Hardware, House Furnishing and Shelf Goods. Will inventory about \$6000. Good location and cheap rent. Investigation solicited. Address

"POCKET AND TABLE CUTLERY,"

office of *The Iron Age*, 96-102 Reade St., N. Y.

## TO LET FOR MANUFACTURING USES.

At South Easton, Pa., on line of Lehigh Valley Railroad and on Lehigh Canal. Sidings in buildings. Electric light. Electric street railway. One main 2-story building, 275 ft. x 45 ft. Steam Engine. Shafting and complete appurtenances for first-class factory or machine shop. One high 1-story building, 80 ft. x 45 ft. Cement floor. One 2-story building, 35 ft. x 45 ft. ground floor suitable for smith shop, etc.

These buildings were erected for galvanizing and barb wire plant, and more recently, for several years, have been in the occupancy of The National Switch & Signal Co. They form part of the plant of The Stewart Wire Co., being separated from its main plant by the Lehigh Canal. Affords a most desirable opportunity for industry using wire in any of its forms and is an exceptionally fine location for manufactory of any character.

Will be let in whole or in part, with or without the adjacent thoroughly equipped and complete Wire Drawing Mill, steam and water power, situated on same side of Canal. For further particulars address

**THE STEWART WIRE CO.,**  
Easton, Pa.

## Locations for Factories.

The name of the Chicago, Milwaukee & St. Paul Railway has long been identified with practical measures for the general upbuilding of its territory and the promotion of its commerce, hence manufacturers have an assurance that they will find themselves at home on the company's lines.

The Chicago, Milwaukee & St. Paul Railway Company owns and operates 6,150 miles (9,900 kilometers) of railway, exclusive of second track, connecting track or sidings. The eight States traversed by the company, Illinois, Wisconsin, Northern Michigan, Iowa, Missouri, Minnesota, South Dakota and North Dakota, possess, in addition to the advantages of raw material and proximity to markets, that which is the prime factor in the industrial success of a territory—a people who form one live and thriving community of business men, in whose midst it is safe and profitable to settle. Many towns on the line are prepared to treat very favorably with manufacturers who would locate in their vicinity.

Mines of coal, iron, copper, lead and zinc, forests of soft and hard wood, quarries, clays of all kinds, tan-bark, flax and other raw materials exist in its territory in addition to the vast agricultural resources.

A number of new factories have been induced to locate—largely through the instrumentality of this company—at towns on its lines. The central position of the States traversed by the Chicago, Milwaukee & St. Paul Railway makes it possible to command all the markets of the United States. The trend of manufacturing is Westward. Nothing should delay enterprising manufacturers from investigating. Confidential inquiries are treated as such. The information furnished a particular industry is reliable. Address

**LUIS JACKSON,**

Industrial Commissioner, C., M. & St. P. R'y,  
425 Old Colony Building, CHICAGO, ILL.

## LUXURY ON WHEELS.

Solid through trains between Cincinnati, Toledo and Detroit. Pullman Vestibuled Trains between Cincinnati, Indianapolis and Chicago. Through car lines from Cincinnati via Indianapolis to St. Louis; also Cincinnati via Indianapolis to Decatur, Springfield, Ills., and Keokuk. These are the only lines running Pullman Vestibule and Dining Cars between the cities named. See that your ticket reads via Cincinnati, Hamilton and Dayton.

WM. M. GREENE, Gen'l Manager,  
D. G. EDWARDS, Gen'l Passenger Agent  
Cincinnati, O

## WANTED.

Agency for a mill manufacturing standard goods of iron or steel and which have or desire to have a market in New England for their product.

**M. T. DENHAM,**  
Rooms 78 and 79 Mason Building, Boston, Mass.

## WANTED.

An able man with \$10,000 or \$15,000 capital to take the secretary and treasurerhip of concern in a manufacturing business in Chicago. Already established and incorporated for \$100,000. Sales past eight months amounted to over \$190,000 and can be more than doubled from now on. Profits large and business grown beyond our capital. Best of references given and same required. Must be of good habits and energetic. For further information address

"METAL,"

office of *The Iron Age*, 59 Dearborn Street, Chicago.

## FOR RENT.

Factory, 40 x 140, two stories, ¾ acre lot, two side tracks, 50 H. P. engine and boiler. Suitable for bolt, hardware manufactory or foundry; \$600 per year for five year lease. Bolt machinery.

**PETER SAMES,**  
Rockford, Ill

## WANTED.

To furnish reasonable estimates on specialties in light metal work.

**CLARK & COWLES,** Plainville, Conn.  
Manufacturers of Clock Trimmings, Rivets, Springs &c.

## FOR SALE,

in one of the best agricultural and fruit growing sections of California, a general stock of Hardware, Agricultural Implements, Stoves, Tinware, &c. Stock will now invoice about \$30,000, but can be reduced. Best of reasons for selling. Inquire of

**W. W. MONTAGUE & CO.,** or **DUNHAM, CARRIGAN & HAYDEN CO.,** San Francisco, Cal.

## EXECUTOR'S SALE

of Hardware, Plumbing and Metal Working business to close estate of late James G. Burt. Business established twenty years. Stock and fixtures \$20,000 to \$25,000. A rare opportunity for investment in paying business in "Sunny California." Address

**D. A. MOULTON,** Executor,  
San Bernardino, Cal.

## Chicago Storage Warehouse.

General merchandise storage, with desk room if wanted, situate in wholesale district.

Apply to  
**C. P. SHERWOOD,**  
294-300 Franklin Street,  
Chicago, Ill.

## EUGENE V. N. BISSELL, Auctioneer. E. BISSELL, SON & CO.,

Successors to  
**HAYDOCK & BISSELL,**  
WHOLESALE  
**HARDWARE AUCTIONEERS,**  
19 Murray St. and 15 Park Place, N. Y.  
Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

## ADOLPH BUTZE,

Manufacturers' Agent.  
Railroad, Packing House and Contractors' Supplies.

—AGENT FOR—  
**LATROBE STEEL WORKS,** Locomotive and Car Wheel Tires. **UNITED RUBBER CO.,** Hose, Packing, &c. **GEO. GRIFFITHS CO.,** Shovels, Scoops, &c.  
**Corrugated Galvanized and Sheet Iron,** Plate, Tank and Bar Iron, Waste—White, Colored and Wool.  
Bank of Commerce Bldg. St. Louis, Mo.

## Collections?

**ATTENTION! Merchants and Manufacturers.**—We collect your past due accounts. Do not let them remain too long upon your books. Send for our draft book.

**THE HARDWARE BOARD OF TRADE, Ltd.,**  
4 and 6 Warren street, New York.  
**JAS. H. GOLDEY,** Treas.

## Specialties Wanted.

A manufacturer, whose line of tools is not equal to the capacity of his works, would like to add some new specialty tools to his present line. For further information address

"TOOL SPECIALTIES,"  
office of *The Iron Age*, 96-102 Reade Street, New York.

**FOR SALE.**

**COUNTY or STATE RIGHTS** for a very superior cheap portable steel or iron **CULVERT BRIDGE**. It is adapted to all small streams, runs, etc. It is just the thing to improve **ROADS AND HIGHWAYS**. It can be placed below or on the level with the road. It also makes a most excellent **RAILROAD CULVERT, GUTTER CROSING and CITY or TOWN CULVERT**. Apply to

W. A. NICHOLS,  
Girard Building, Philadelphia, Pa.

**HELP WANTED.**

*Undisplayed Advertisements for Help Wanted not exceeding fifty words One Dollar each insertion. Additional words two cents each.*

**SHEET MILL MANAGER.**—Wanted, a practical man accustomed to steel sheet rolling, for an English works; must be able to turn rolls. Apply in first instance to "X. Y. Z., 100" office of *The Iron Age*, 96-102 Reade St., N. Y.

**EXPERIENCED** traveling salesman to sell steel hollow ware and other goods on commission in the New England States and also in New York City and Philadelphia. Address "HOLLOW WARE," office of *The Iron Age*, 96-102 Reade St., New York.

**A THOROUGHLY** competent man as assistant superintendent in a large machine works; must be well up in modern shop practice, a thorough mechanic and draughtsman, able to handle a large force of men so as to get results and willing to push hard all the time. Address "N. H. Co.," office of *The Iron Age*, 96-102 Reade St., New York.

**WANTED.**—A line of shelf hardware or carriage goods that will share with another line that does not conflict the expense of a good salesman covering all the Eastern and Central States as far as the Mississippi River. Address "SHELF or CARRIAGE," office of *The Iron Age*, 96-102 Reade St., New York.

**BRIGHT YOUNG MAN**, good education and connections, thorough knowledge iron commission, to associate with gentleman with capital, same line. Address "D. W.," office of *The Iron Age*, 220 S. 4th St., Philadelphia.

**A COMPETENT SALESMAN** to represent an old established malleable iron foundry; one thoroughly acquainted with the trade; reference required. Address "MALLEABLE," No. 816, office of *The Iron Age*, 96-102 Reade St., New York.

**A YOUNG MAN** possessing the necessary personal qualifications and having \$10,000 to invest in interest bearing securities (not stock) can obtain a position as secretary of a large and long established manufacturing company. Please address reply to "CORPORATION SECRETARY," office of *The Iron Age*, 96-102 Reade St., New York.

**A MAN AS FOREMAN** or assistant superintendent in a bolt works; must be able to handle men well, look after every detail and push all the time and at everything; none but a competent and experienced man need apply; to the right man a steady place is assured with chance for advancement; please state age, habits, references and compensation desired. Address "PUSH," No. 816, office of *The Iron Age*, 96-102 Reade St., N. Y.

**WANTED.**—Agents in New York, Pennsylvania, Ohio, Indiana and Michigan to carry a staple line of Hardware on commission. Address "EDWARDS," office of *The Iron Age*, 312 Cuyahoga Building, Cleveland, O.

**SITUATIONS WANTED.**

*Undisplayed Advertisements for Situations Wanted not exceeding fifty words Fifty Cents each insertion. Additional words one cent each.*

**BY A THOROUGH** hardware salesman, 30 years, has energy and ability, had 12 years' experience in wholesale and retail hardware and sporting goods house, wants any position where hard work and push will advance; best of reference or security. Address "HARD WORKER," office of *The Iron Age*, 96-102 Reade St., New York.

**AS FOUNDRY FOREMAN** have been employed as foreman in McCormick Harvesting Machine Works, Chicago, for past eight years; married, sober and competent; can furnish best of references. Address A. BRAIDWOOD, 1002 W. Monroe St., Chicago, Ill.

**MANUFACTURERS** wishing their goods placed before the hardware trade of New York, Pennsylvania, Vermont and Canada, both wholesale and retail, on commission, by a thoroughly competent representative, acquainted with the trade, address "MANUFACTURERS' AGENT," No. 96, office of *The Iron Age*, 96-102 Reade St., New York.

**AS SUPERINTENDENT** or ASSISTANT of iron or steel mill, have had over 20 years' experience as such, fully understand puddling and all other branches, have built several mills, making all plans and drawings, am up in structural and bridge shapes; will take position as department foreman or assistant; best of references and low salary. Address "LONG EXPERIENCE," office of *The Iron Age*, 96-102 Reade St., New York.

**SUPERINTENDENT** or MANAGER.—Educated practical engineer and foundry manager, thoroughly versed in mechanical and executive departments of foundry and engineering business; 15 years general superintendent of large works; is open for position with machinery, stove or steel casting foundry; competent to take full charge if desired; All references. "D. H. E.," office of *The Iron Age*, 96-102 Reade St., New York.

**COMPETENT PARTY** experienced in designing, calculating cost, strength, power, in superintending construction of steam, hydraulic and other machinery, of iron and steel plants and machinery and structural iron work; familiar with best shop and office practice; wishes responsible position; has been chief draftsman, mechanical engineer and assistant superintendent in large shops before. Address "T. V.," 1024 Park Avenue, New York.

**AS FOREMAN** or SUPERINTENDENT of a wire mill, 16 years' experience, successful in handling men, do not know it all, but am a hard worker, honest and sober. Please address "WORKER," office of *The Iron Age*, 96-102 Reade St., New York.

**A HARDWARE SALESMAN** of ability with experience conducting business desires position as manager of a retail business or agent for manufacturer; would accept a position on the road; eight years' practical experience in builders' hardware and contractors' supplies; first-class references. Address "PENNE," office of *The Iron Age*, 96-102 Reade St., New York.

**A MAN** of large experience in the hardware and cutlery business will be at liberty Sept. 1st to make an engagement with a view to permanency, is well acquainted with Western trade and can in good times influence a large volume of it, or would accept an engagement east of Chicago in any good field, representing general trade or specialties; references first-class in every particular. Address "WESTERN TRADE," office of *The Iron Age*, 96-102 Reade St., N. Y.

**BY DESIGNER** AND DRAFTSMAN, with technical education, machine shop training and office experience in machine, tool and crane work of all kinds. Address "SHOP TRAINING," office of *The Iron Age*, 96-102 Reade St., New York.

**A N AGENT** for a cutlery house would like to make arrangements either with a jobbing house or with manufacturer to sell goods on Pacific Coast on a commission; All references in New York. Address "D. H.," 503 Kearney St., San Francisco, Cal.

**A MEMBER** OF INSTITUTION OF MECHANICAL ENGINEERS, with practical experience as follows, machinist, head draughtsman, superintendent of construction, works manager, factory buildings and plant, machine tools, complete installation of manufactories (electrically driven), is open to engagement. Address "H. F.," No. 823, office of *The Iron Age*, 96-102 Reade St., New York.

**A MAN** of wide experience in builders' and general hardware, having for many years held positions of responsibility, wishes to form a connection with manufacturer or dealer; special qualifications for builders' hardware department; willing to purchase an interest in a business. Address "WIDE EXPERIENCE," office of *The Iron Age*, 96-102 Reade St., N. Y.

**AS SUPERINTENDENT** or FOREMAN of modern malleable iron foundry; 15 years' practical experience; capable of constructing, equipping and managing same in all its branches; can furnish drawings for equipments in every department, also best of references from among the most reliable manufacturers in the business; proofs of capability can be obtained by visit to plant where now employed as superintendent. Address "MODERN FOUNDRY," office of *The Iron Age*, 96-102 Reade St., New York.

**BY A YOUNG MAN**, as foreman of bench or light machinery foundry; am capable of handling any number of men to the best advantage; am considered a hustler; can run shop successfully with boys or change shop from a day work to piece work system; fully understand the mixing of metals. Answer "SYSTEM," No. 830, office of *The Iron Age*, 96-102 Reade St., New York.

**THE SECRETARY** AND TREASURER of a large manufacturing corporation, who has occupied his present position for the past fifteen years, desiring to make a change at the end of the present year, solicits correspondence with parties having a like position to fill in some first-class establishment, where integrity, capacity and energy are required and where an extensive acquaintance with large hardware dealers throughout the country will be an advantage; the highest testimonials will be furnished. Address "F. G. H.," office of *The Iron Age*, 96-102 Reade St., N. Y.

# HARDWARE MACHINERY, PAPER BOX MACHINERY, MATCH MACHINERY.

SEND FOR CATALOGUE.

**HERRICK & COWELL,**  
36 ARTIZAN ST.,  
NEW HAVEN, - CONN.

**THE LATEST BOOKS.**

**How to Build Dynamo-Electric Machinery.** Embracing theory designing and the construction of dynamos and motors, with appendices on field-magnet and armature winding, management of dynamos and motors, and useful tables of wire gauges. By E. TREVERT. 339 pages, illustrated, cloth. \$2.50

**How to Become a Successful Electrician.** The Studies to Be Followed, Methods of Work, Fields of Operation and Ethics of the Profession. By T. O'CONNOR SLOANE. 16mo, cloth, illustrated. \$ .00

**The Engineer's Year Book of Formulas, Rules, Tables, Data and Memoranda in Civil, Mechanical, Electrical, Marine and Mine Engineering.** By H. R. KEMP. 700 illustrations, 8vo., cloth. \$3.20

**Elementary Metal Work.** A practical manual for amateurs and for use in schools. By C. G. LELAND. 111 pages, 4to., cloth. \$1.50

**Refuse Destructors, with Results Up to Present Time.** A Handbook for Municipal Officers, Town Councilors and others interested in Town Sanitation. By CHARLES JONES. With a paper on the utilization of town refuse for power production. By THOMAS TOMLINSON. 8vo, cloth, 2d and revised edition. \$2.00

**The Mineral Industry, Its Statistics, Technology and Trade in the United States and other countries.** From the earliest times to the end of 1893. By R. P. ROTHWELL. Vol. II. 4to., cloth. \$5.00

**The Animal as a Machine and a Prime Motor and the Law of Energetics.** By R. H. THURSTON. 12mo, cloth. \$1.00

**The Practical Application of Dynamo-Electric Machinery.** By C. K. MACADDEN and W. D. RAY. 167 pages, illustrated, cloth. \$1.00

**Kitchen Boiler Connections.** A selection of Practical Letters and Articles Relating to Water Backs and Range Boilers. Compiled from THE METAL WORKER. The main divisions of the volume are as follows: Water Backs and their Construction; Boiler Construction, Operation and Connections; Circulating Pipes; Multiple Connections; Double Boilers; Difficulties Met in Every Day Practice; Relief Pipe and Vacuum Valve; Horizontal Boilers; Miscellaneous; Heating Room from Kitchen Boiler; Radiators Heated from Coils in Stoves. 71 illustrations; 8vo, 140 pages. Cloth. \$1.00

**An Introduction to the Study of Metallurgy.** By W. C. ROBERTS AUSTEN. Third edition, 379 pages, illustrated, cloth. \$4.00

**Modern Methods of Sewage Disposal for Towns, Public Institutions, and Isolated Houses.** By G. E. WARING, Jr. 252 pages, cloth. \$2.00

**Practical Instructions in Quantitative Assaying with the Blowpipe.** By E. L. FLETCHER. 142 pages, morocco, \$1.50; cloth, \$1.25

**The Metallurgy of Gold.** T. KIRKE ROSE, 462 pages, illustrated, cloth. \$6.50

**Practical Hints on the Construction and Working of Regenerator Furnaces.** By MAURICE GRAHAM. 131 pages, leather. \$1.25

**The Gas Engineer's Laboratory Handbook.** By J. HORNEY. 12mo, cloth. \$2.50

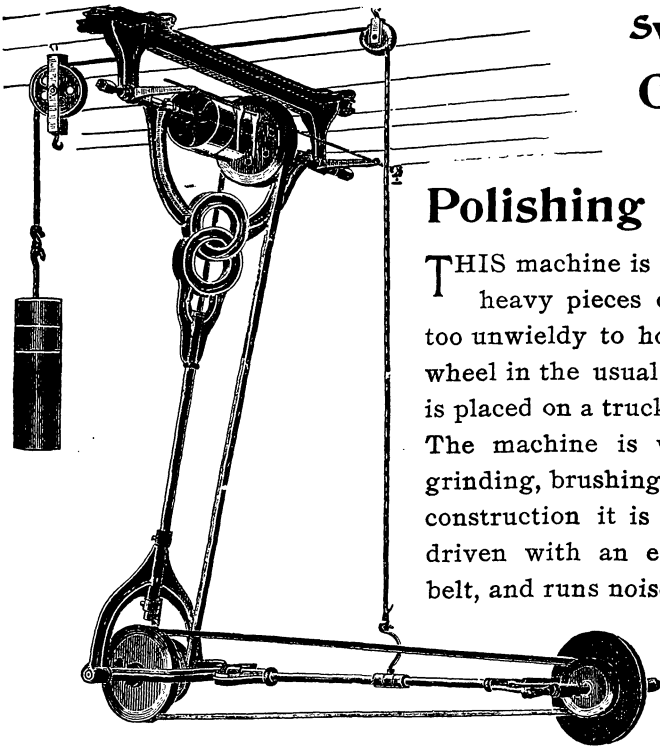
**Practical Paper Making.** A Manual for Paper Makers and Owners and Managers of Paper Mills, to which are appended useful tables, calculations, data, &c. By GEORGE CLAPFERTON. With illustrations reproduced from micro-photographs. 8vo, cloth. \$2.50

**Electrician at Home.** In Two Parts. Part I. Electro-Plating at Home, by GEORGE EDWINSON. Part II. Electric Bells, by GEORGE EDWINSON. Illustrated with numerous diagrams and explanatory sketches. Edited by F. CHILTON YOUNG. 12mo, cloth. (Amateur's Practical Aid Series.) \$0.40

Sent, post-paid, upon receipt of price, by

**DAVID WILLIAMS, Publisher and Bookseller,**

96-102 Reade Street, New York.



## Swing-Frame Grinding

AND

## Polishing Machine.

THIS machine is designed to dress heavy pieces of work that are too unwieldy to hold to the emery wheel in the usual way. The work is placed on a truck or on the floor. The machine is well adapted to grinding, brushing or polishing. In construction it is first-class. It is driven with an endless V leather belt, and runs noiselessly.

For further particulars write the manufacturers.

## CUTTER, WOOD & STEVENS,

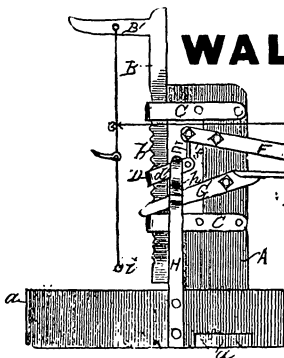
Manufacturers of Emery Wheel Machinery and  
Polishers' Supplies,

131 Pearl Street, Boston, Mass., U. S. A.

## FOR SALE.

THE PATENT FOR

## WALLACE LIFTING JACK,



covered by No. 428,027, issued 13th May, 1890. This is one of the best jacks ever invented, but owing to other business would like to dispose of the patent. If you are interested address

GEO. H. FERNALD, North East, Erie Co., Pa.

## Get Your CRUCIBLE : STEEL : CASTINGS AND FINISHED IRON AND STEEL MOTOR GEARS FROM

THE KING & ANDREWS CO.,

No. 218 N. Union Street, CHICAGO, ILLS.

We are especially equipped for heavy and light castings, prompt production and shipment, and have unsurpassed facilities for making the best quality of

## SOLID STEEL CASTINGS.

Send Us Your Patterns and We Will Make the Castings While You Wait.

## THOMAS SANDS, Nashua, N. H.,

PROPRIETOR OF

"W. T. FLANDERS'" PROCESS FOR TINNING CAST IRON  
"FLANDERS'" IMPROVED PROCESS FOR GALVANIZING.

CONTRACTOR FOR

BUILDING GALVANIZING and TINNING WORKS.

Correspondence solicited,

E

## ELECTRICAL BOOKS.

### The Phonograph and How to Construct It.

With a chapter on sound. By W. GILLETT. Deals with the construction of the phonograph in such a plain manner that the student will clearly understand its construction. A complete set of drawings to scale of the various parts of the phonograph accompany the book. 87 pages, illustrated, 12mo, cloth .....\$2.00

### Standard Tables for Electric Wiremen, with

Instructions for Wiremen and Linemen. Rules for Safe Wiring, Diagrams of Circuits and Useful Formulas and Data. By CHARLES M. DAVIS. Third edition, thoroughly revised and edited by W. D. Weaver. Illustrated, 18mo, mor. ....\$1.00

### Practical Electric Light Fitting.

By F. C. ALLSOP. A treatise on the wiring and fitting-up of buildings deriving current from central station mains and the laying down of private installations 290 pages, 12mo, cloth .....\$1.50

### Electrical Tables and Memoranda.

By SYLVANUS P. THOMPSON and E. THOMAS. 128 pages, 2 x 2 3/4 inches, roan .....\$0.50

### Johnston's Electrical and Street Railway

Directory. Fourth Year of Publication, 8vo, cloth .....\$5.00

### Measurements of Electric Currents.

Electrical Measuring Instruments, by JAMES SWINBURNE. Meters for Electrical Energy. By C. H. WORDINGHAM. Edited by T. COMMERFORD MARTIN. Illustrated, 1 folding plate .....\$0.50

### The Measurement of Electrical Currents

and Other Advanced Primers of Electricity. By E. J. HOUSTON. 429 pages, 169 illustrations .....\$1.50

### The Electric Railway in Theory and Practice.

By O. T. CROSBY and DR. LOUIS BELL. Second edition, revised and enlarged, 183 illustrations. 8vo, cloth .....\$2.50

### How to Use Electrical Measurement Apparatus.

By CHAS. P. FREY. A Manual of Practical Information Relating to Electrical Testing. Illustrated. 8vo, paper .....60c.

### The Electric Transmission of Intelligence.

By PROF. E. J. HOUSTON. And other Advanced Primers of Electricity. 88 illustrations. 12mo, cloth .....\$1.00

### Dynamos, Alternators and Transformers.

By G. D. KAPP. Giving an exposition of the general principles underlying the construction of dynamo-electric apparatus without the use of high mathematics and complicated methods of investigation. 12mo, cloth .....\$4.00

### The Science and Practice of Lighting, as applied

to sheets, open spaces and interiors. By W. H. Y. WEBBER. An elementary study. A series of articles contributed to the *Journal of Gas Lighting*, etc. 8vo, cloth .....\$1.40

### Experimental Electricity.

By E. T. TREVERT. Numerous illustrations. New revised and enlarged edition. 12mo, cloth .....\$1.00

### Electric Lighting for Marine Engineers ; or

How to Light a Ship by the Electric Light and How to Keep the Apparatus in Order. By SYDNEY F. WALKER. 293 pages, illustrated, 8vo, cloth ...\$2.00

### The Dynamo, Its Theory, Design and Manufacture.

By C. C. and F. WALLIS HAWKINS. 190 illustrations. Thick 12mo, cloth. (The Specialists' Series) .....\$3.00

### Electrical Distribution.

By M. H. KILGOUR, H. SWAN and C. H. W. BIGGS. Its Theory and Practice. 174 illustrations. 12mo, cloth .....\$4.00

### Portable Electricity: Being a Treatise on

the Application, Methods of Construction and Management of Portable Secondary Batteries. By J. T. NIBLETT. Fully illustrated 8vo, cloth .....\$1.00

### Practical Dynamo Building.

By L. C. ATWOOD. With Detail Drawings and Instructions for Winding. Giving correct sizes of Wire, Dimensions of Iron, etc. etc., also Diagram for House Wiring. Illustration and Plates. 4to, cloth .....\$3.00

### The Dynamo, How Made and How Used.

By S. R. BORTONE. Eighth edition, with additional matter and illustrations. 12mo, cloth .....\$1.00

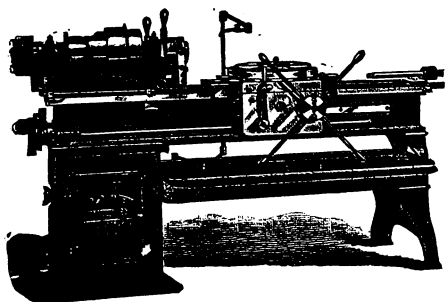
Sent, post-paid, on receipt of price by

DAVID WILLIAMS,

Bookseller and Publisher,

96 - 102 READE ST., N. Y.





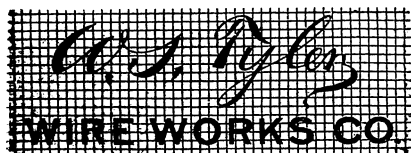
HAVE YOU A  
**FLAT TURRET LATHE ?**

If not send for

**RAPID LATHE WORK.**

**JONES & LAMSON MACHINE CO.,**

SPRINGFIELD, VT., U. S. A.



MANUFACTURERS OF

**Light Architectural Iron  
and Wire Work.**

**GRILLS OF EVERY DESIGN,**

In Brass, Iron and Steel, Electroplated, Oxidized and Berlin or Rustless Black.

W. S. TYLER, Pres. PROCTOR PATTERSON, Sec. & Treas  
CLEVELAND, OHIO.

**LABORATORIES OF  
DR. GIDEON E. MOORE,**  
221 Pearl St., New York.

**DEPARTMENT OF CHEMISTRY.** Analyses and Assays of Ores, Metals, Waters, Fuel, Oils and Natural and Industrial Products of every description.

**DEPARTMENT OF PHYSICAL TESTS.** Chas. F. McKenna, Director. Tensile, Transverse and Compression Tests of Iron, Steel and other Metals and Alloys, Cements, Building Stones and Engineering Materials generally. Tests of Lubricating Value of Oils, etc., etc.

PRINTED PRICE-LISTS ON APPLICATION.

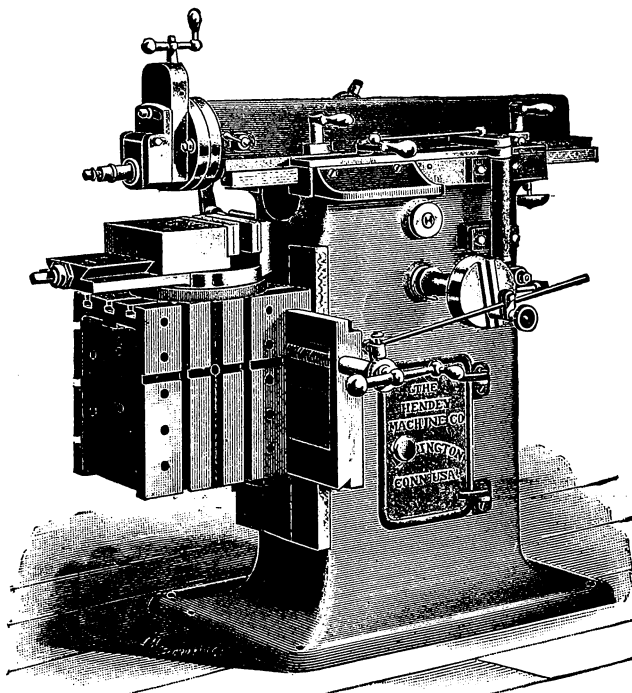
**ALUMINUM.**

**The Pittsburgh Reduction Co.,**

701 Ferguson Block, Pittsburgh, Pa.,

Offer Aluminum guaranteed equal in purity to the best in the market, at lowest rates obtainable.

**ALUMINUM SHEET, WIRE,  
AND CASTINGS.**



24-inch Improved Hendey Shaper.

**COMBINES the LATEST and BEST Improvements.**

Useful Attachments, Strong and Powerful. Changes Made Rapidly. Uniform Cutting Speed. For Tool Room use or all around Machine Shop Work.

**THE HENDEY-NORTON LATHE.**

It stands at the head. It has no rival.

It represents modern ideas and modern practice in Screw Cutting Engine Lathes.

We challenge a comparison of its conveniences,

Useful attachments and every day merits with ANY lathe made.

Buy the best. Keep up with the times.

Send for Circulars.

**The Hendey Machine Co., Torrington, Conn.**

EUROPEAN AGENTS:

SCHUCHARDT & SCHUTTE Berlin.

CHAS. CHURCHILL & Co., London.

EUGEN SOLLER, Basel, Switzerland.

**PROFILE or FACE CAM MILLING.**

We are prepared to mill Face Cams with the utmost accuracy and perfect in finish at very moderate prices.

*For further particulars apply to*

**THE NEWARK MACHINE TOOL WORKS,**

NEWARK, N. J.

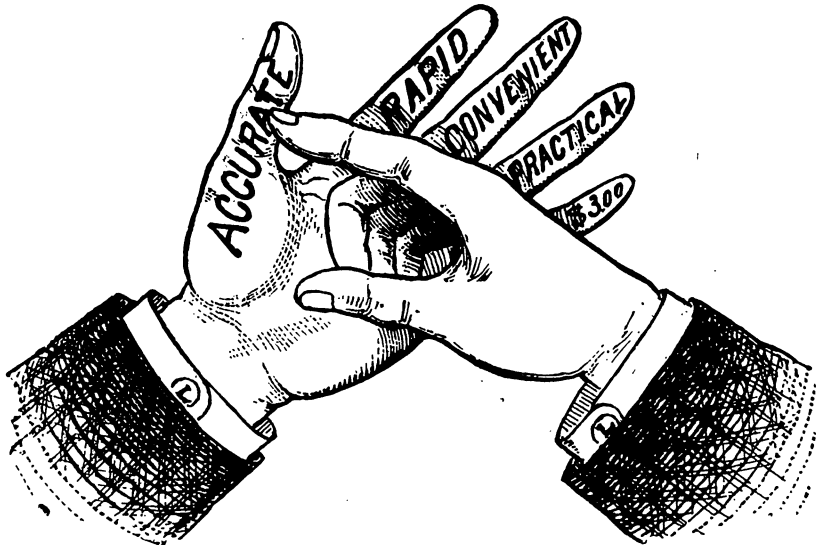
**An Early Start for 1895.**

In order that unoccupied territory missionary work for 1895 may be done this year, E. C. Stearns & Co. are talking about Agencies for 1895. Perhaps you are the very man they want. Perhaps not. Correspondence or a personal interview will show. It isn't everybody who will do. Only the best agents are selling the best machine.

**E. C. Stearns & Co., Syracuse, N. Y.**



## LADD'S DISCOUNT BOOK.



For Example, we desire to find the net of \$73.00 at discount 65, 20, 7½, 5 and 2½ per cent. By the old way we take our pencil, and, after a deal of figuring, conclude (if we haven't made an error) that the result should be \$17.51, but we are not sure of it till we prove it. By the new way (the use of Ladd's Discount Book), we put our finger right on it in a moment, and know that the result is correct.

The book contains over 100,000 computations, and is indispensable where percentages are employed. Price, per mail, \$3.00. Double Indexed Edition, \$4.00.

Sent, post-paid, on receipt of price, by

David Williams, Publisher and Bookseller,  
96-102 Reade Street, New York.

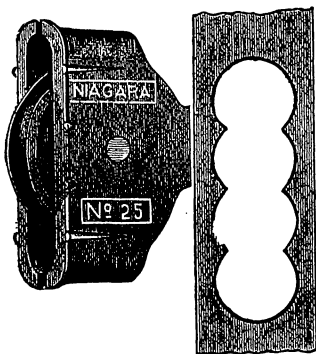
## WHITE MOUNTAIN FREEZERS.

THE  
BEST  
FREEZER.

Heavy Waterproof Tubs. Cans of Charcoal Tin-plate. Malleable Iron Dashers. All inside parts tin-plated. Gearing completely covered.

THE  
BEST  
SELLER.

The White Mountain Freezer Co., Nashua, N. H.



## THE REPUTATION

of the "Niagara" and original "Clark" patterns of FRAME PULLEYS make them desirable goods for any hardware dealer to handle. We have purchased the patterns and all interests of The Shepard Hardware Co. in these goods, and they will in future be made solely by us. We make the prices right, too.

The Wrightsville Hardware Co., Wrightsville, Pa.

SURPLESS, DUNN & ALDER., 15 Murray Street, New York, Agents.  
Henry Keidel & Co., Southern Agents, 25 Hanover St., Baltimore, Md.

## COVERT'S BANNER BOLT SNAP.



This snap has many important advantages over other makes of Bolt Snaps, viz.: It is lighter, the spring is entirely covered and protected from foreign substances and freezing, and is lower in price.

Made in all sizes: Round, Loop and Open Eye. We are headquarters and the most extensive manufacturers in Saddlery, Coach and General Hardware Specialties.

Covert's Saddlery Works,  
FARMER, N. Y., U. S. A.

Hardware Dealers  
Can Profitably  
SELL BICYCLES.

There is a large trade in Bicycles in all parts of the country and much of that trade naturally belongs to dealers in hardware. Good bicycles meet with a ready sale and pay a fair percentage of profit.

## COLUMBIAS

Are the representative high grade machines in America. A Columbia is the easiest machine to sell to the best trade because it is unquestionably the standard wheel of the world.

We want enterprising agents of good standing and solicit correspondence.

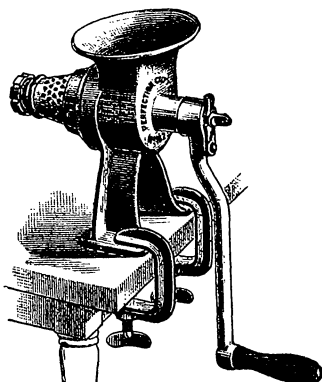
Pope Mfg. Co.,  
221 Columbus Ave.,  
Boston, Mass.

## MECHANICS



DIPLOMAS AWARDED. Courses in other trades, all including thorough instruction in Mathematics and Physics. Send for FREE Circular, stating subject you wish to study, to The Correspondence School of Mechanics, Scranton, Pa.

THE LATEST, BEST, MOST PRACTICAL,  
AND IMPROVED FOR FAMILY USE.  
Simple to use. Easy to clean.  
Of few parts. Requires no repairs.  
Easily put together and taken apart.  
No parts to wear out or become dull.  
Does not mash or grind meats, etc.  
All parts coated with pure black Tin.



THE NEW . . . .

1894 PATTERNS.

Perfection  
. . . CUTTER.

Manufactured by

NORTH BROS. MFG. CO.,  
PHILADELPHIA, PA.

JOHN H. GRAHAM & CO., Mfrs. Agents,  
113 Chambers St., New York.

# CLARK'S BEST QUALITY SCREW DRIVERS.



Four Drivers and one Handle; all interchangeable; are hardened and tempered all over; made of best stock, and finished first-class.

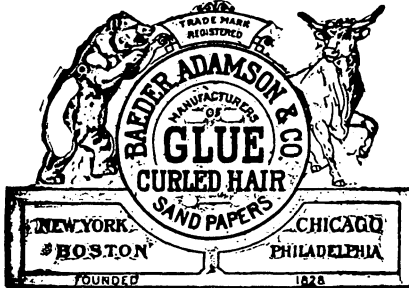
FOR SALE BY ALL HARDWARE DEALERS.

MANUFACTURED BY

**R. H. BROWN & CO.**

NEW HAVEN, CONN.

*You take no risk on the quality.  
We make only the best!*



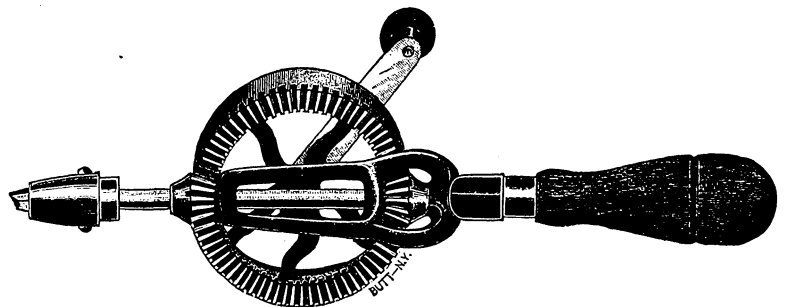
**Sand Papers** { Filnt Paper  
Garnet Paper  
Emery Paper  
Emery Cloth  
in Reams and Rolls

**HAIR FELTING** for covering Boilers, Steam and Water Pipe, and lining Refrigerators.

**BAEDER, ADAMSON & CO.**

730 MARKET STREET, PHILADELPHIA.  
87 BECKMAN STREET, NEW YORK.  
143 MILK STREET, BOSTON.  
192 LAKE STREET, CHICAGO.

## Hand Drill No. 5.



This Drill has every advantage claimed for our Nos. 1 B, 3 and 3 B, so long and favorably known in the market, and in addition has a wide rimmed gear to be grasped between thumb and fingers when the drill is used for delicate work. Used in this manner any jerking motion is overcome and saves liability of breaking points. It also has the advantage over No. 3 B of being \$3.00 per dozen less in the list price. We shall discontinue the three numbers referred to, and when present stock on hand is consumed substitute No. 5 without notice. With No. 5 we furnish six points of same style that are put up with our Automatic Boring Tools. Price per dozen, \$18.00.

**MILLERS FALLS CO.,**  
93 READE ST., NEW YORK.

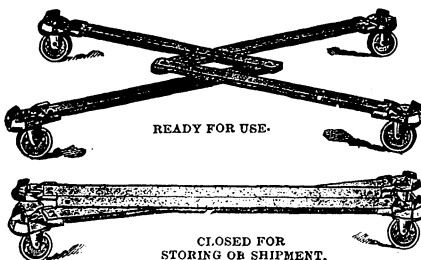
Palmer's Common Sense Frame Pulley.



MANUFACTURED BY

PALMER HARDWARE MFG. CO., Troy, N.Y.

## Lock Frame Stove Trucks.



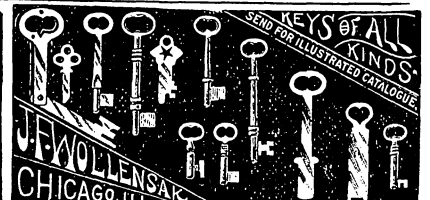
Fit any stove, large or small, without nuts, bolts, screws or yokes. Have the best ball bearing casters.

Fully warranted. Price, \$15.00 and \$18.00 per dozen.

FOR SALE BY MANUFACTURERS

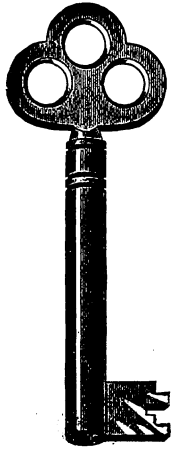
**RANDALL & WARD,**

Le Roy, N. Y.



# CABINET LOCKS

OF EVERY KIND.



DRAWER LOCKS,  
CUPBOARD LOCKS,  
WARDROBE LOCKS,  
CHEST LOCKS,  
DESK LOCKS.

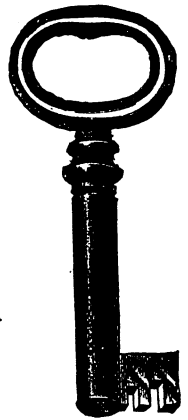
A complete line of more than 1000 list numbers exclusive of our old and complete line of

**YALE CABINET LOCKS.**

**THE YALE & TOWNE M'F'G CO.,**

STAMFORD, CONNECTICUT.

New York. Chicago. Philadelphia. Boston. Pittsburg. San Francisco.



## The only question is Is it Le Page's?

If it is you have made a sale. **HUNDREDS** of **THOUSANDS** of **PLEASED** and **SATISFIED** **CUSTOMERS** testify to the merits of

**LE PAGE'S LIQUID GLUE.**

If you sell it you do not have to **WASTE ANY TIME** in answering questions as to its quality.

The people **KNOW** that **LE PAGE'S GLUE** is the **BEST**. They have used it for years and have proved our claims to be true.

**It is the only Glue made WITHOUT ACIDS.**

A dealer who regards his time as worth anything will not risk losing his **CUSTOMERS' CONFIDENCE** by trying to sell something which is **CLAIMED** to be "just as strong" and "just as good as LePage's."

Don't let your customers go to another store for what they want, but **SELL THEM WHAT THEY ASK FOR.**

We can furnish original and attractive advertising matter for "**LE PAGE'S GLUE**" upon request.

**SEND FOR CIRCULARS AND PRICE-LIST.**

**RUSSIA CEMENT CO.,** Gloucester, Mass.

NEW YORK OFFICE, 95 Reade and 113 Chambers Streets.

PACIFIC COAST OFFICE, 23 Davis St., San Francisco, Cal.

## AN ELEGANT TRADE CATALOG

Attracts attention and makes customers. The addition of a highly artistic Embossed Cover creates a good impression at first glance. Our business is to design and make catalogs complete, including engravings.

**GRIFFITH,**

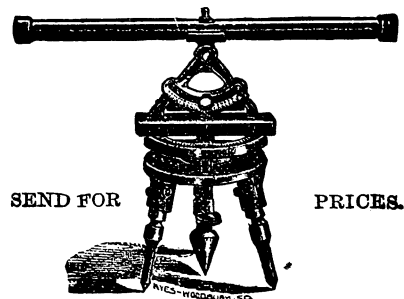
**AXTELL &**

**CADY CO.**

Holyoke, Mass.

Send six cents in stamps for our catalog "E," showing original Embossed Cover designs. **DESIGNERS PRINTERS EMBOSSEERS**

## ARCHITECTS' & CARPENTERS' TRANSIT,



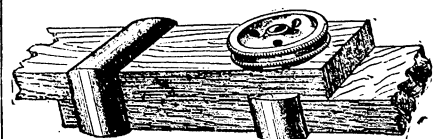
SEND FOR

PRICES.

**C.F. RICHARDSON & SON, Athol, Mass.**

Manufacturers of Iron Levels

and Leveling Instruments.

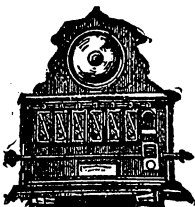


Extension Rules and Hard are Specialties. Send for Catalogue.

**RANSON HARDWARE CO., Burlington, Vt.**

Triple and Quadruple Expansion Engines and Boilers and their Management. By A. RITCHIE LEASE. 59 illustrations, 12mo, cloth. \$2.70

For Sale by David Williams, 96-102 Reade St. N. Y.



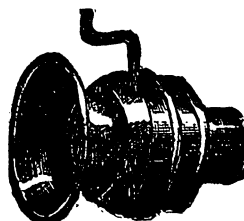
## W. R. OSTRANDER & CO.,

204 FULTON STREET, NEW YORK,

Manufacturers of

**SPEAKING TUBES, WHISTLES, ORAL, ELECTRIC MECHANICAL AND PNEUMATIC ANNUNCIATORS AND BELLS.**

Complete outfits of Speaking Tubes, Whistles, Electric, Mechanical and Pneumatic Bells. A full line always in stock. Send for new catalogue. Factory, DeKalb ave. near Knickerbocker, Brooklyn, N. Y.



# W. & B. DOUGLAS, MIDDLETOWN, CONN.

Branch Warehouses: 85 and 87 John St., New York; 197 Lake Street, Chicago, Ill.

THE OLDEST AND MOST EXTENSIVE MANUFACTURERS OF

## Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps and other Hydraulic Machines in the World.

## DOUGLAS' DIAPHRAGM PUMPS, "Loud Patent."

A LARGE CAPACITY AND EASY WORKING PUMP FOR  
Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries;

Fig. 209.

Fig. 381.

Fig. 145.

or wherever it is desired to raise a large quantity of water by  
hand power.

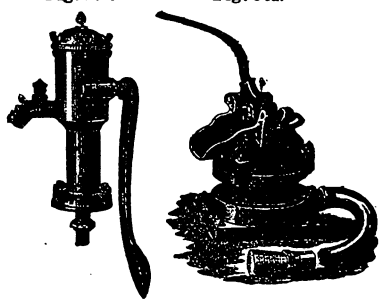
The pump has large valves (accessible by hand), and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

### CAPACITY

from 3,000 to 4,500 gallons per hour.

These pumps are simple, durable and low priced.  
Made either as shown in cut for Hose or for IRON Pipe Suction underneath.

Send for Circular and Price List.



C. I. Grindstone Frame.

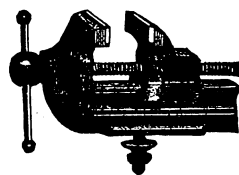
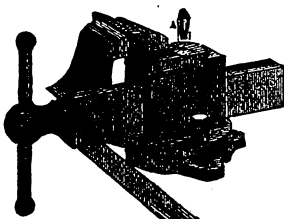
**THE DEMING PUMP & ENGINE CO.**  
PUMPS, WELL SUPPLIES, & C. VERT. PUMPING  
ARTESIAN WELL LINDERS  
STEAM PUMPING  
OFFICE: 72 WIND ST.  
NEW YORK  
CHICAGO, ILL.

## PRENTISS' PAT. VISES.

The Leaders for 20 Years.

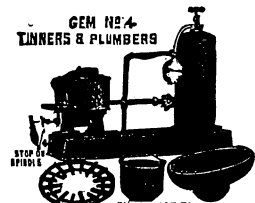
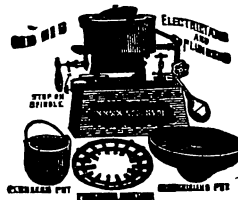
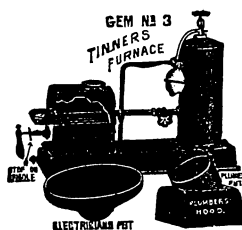
Send for Illustrated Catalogue  
of

ALL KINDS OF VISES.  
PRENTISS VISE COMPANY,  
MANUFACTURERS,  
44 Barclay St., New York.



## Burgess Gem Gasoline Soldering Furnaces.

Have Slotted Cylindrical Cast Iron Burner, shape is such that Solder Cannot Clog them.



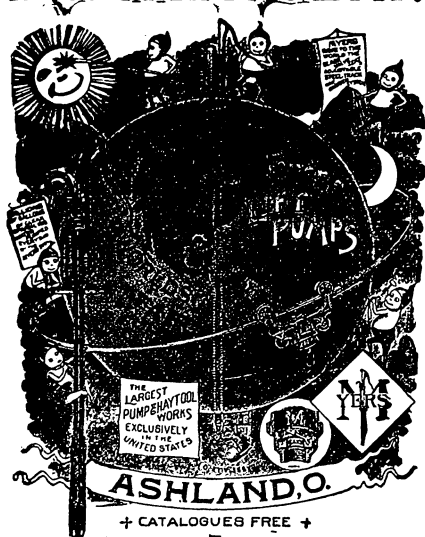
Gem No. 4 and 6 will melt 12 lbs. of lead in 8 minutes, heat your coppers and melt metal at same time.

Gem No. 3 and 6 is sold with a GUARANTEE that if it cannot be worked out of doors or on roofs in all kinds of weather your money will be refunded.

Ask your Jobbers for them or write for prices.

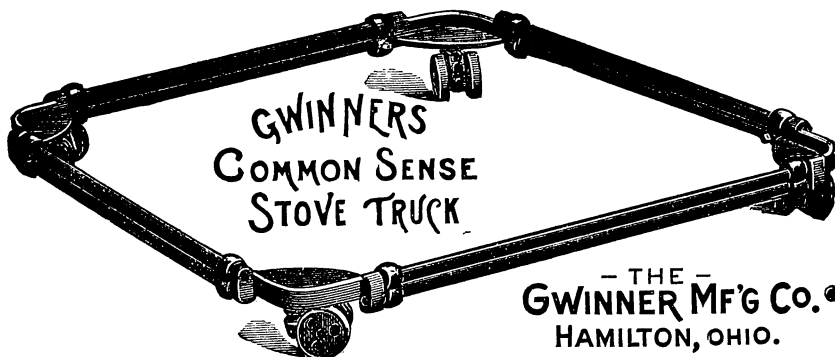
Manufactured by Burgess Soldering Furnace Co., COLUMBUS, OHIO.

## F.E. MYERS & BRO.



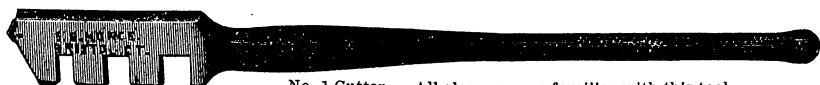
Ashland Pump and Hay Tool Works.

The New York Safety Dumb Waiter.  
"The Manhattan Dumb Waiter."  
The Improved Humphrey Hand Elevator.  
Made specially to be sold by Hardware Stores.  
Thousands in use. Catalogues on application.  
**THE STORM MANUFACTURING CO.**  
NEWARK, NEW JERSEY.  
Formerly of Poughkeepsie, New York.



— THE —  
**GWINNER MFG CO.**  
HAMILTON, OHIO.

MONCE'S NOVELTY GLASS CUTTERS. — INTERCHANGEABLE LOCK STENCILS.

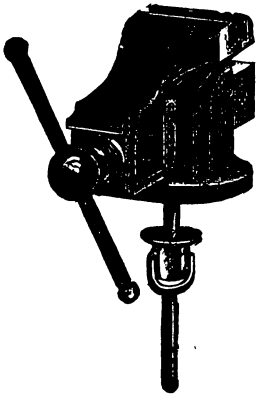


No. 1 Cutter. All glassmen are familiar with this tool.

**S. G. MONCE, BRISTOL, CONN.**



**Athol Machine Co.,**  
Selling Agents.



**HOLLANDS' OFFSET JAW VISE.**

Specially adapted for drill press work where chucks cannot be used and equally good for special or regular bench work.

Hollands Mfg. Co.,  
ERIE, PA.,  
Manufacturers all styles VISES.

**Red Jacket Mfg Co.**

DAVENPORT  
IOWA, U.S.A.

Manufacture the

**Only Pump**

in the U. S.

that works easily in wells of any depth, and can easily be fixed by any one with a monkey wrench without taking the pump from well or tearing up the platform.

WRITE FOR PRICES.

**Chas. Millar & Son,**  
General Eastern Agts.,  
UTICA, N. Y.

**THE TECHNO-CHEMICAL RECIPT BOOK.**  
CONTAINING

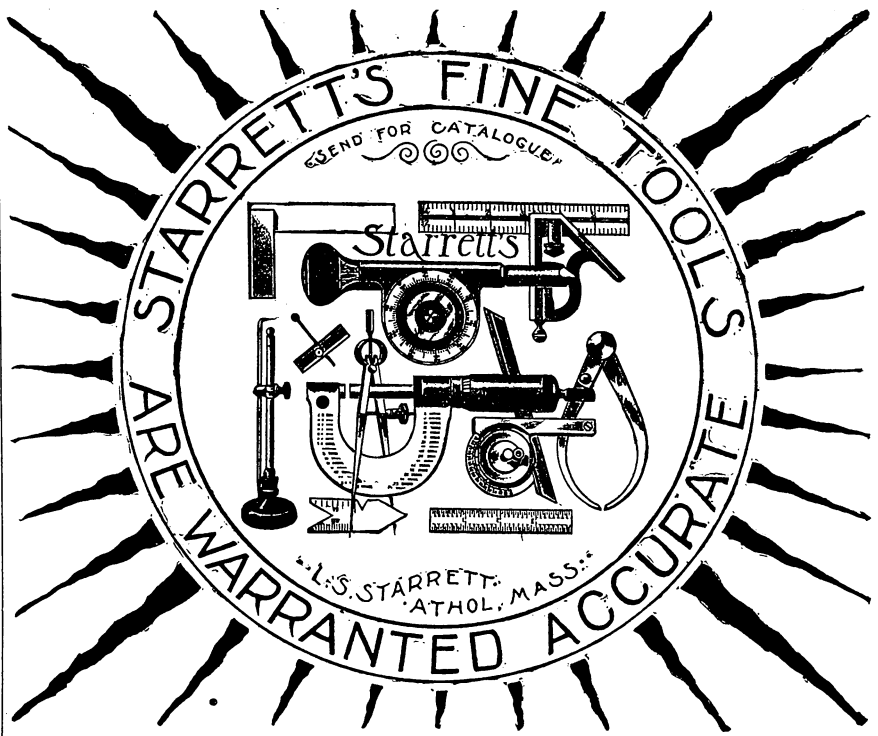
SEVERAL THOUSAND RECEIPTS, COVERING THE LATEST MOST IMPORTANT AND MOST USEFUL DISCOVERIES IN CHEMICAL TECHNOLOGY, AND THEIR PRACTICAL APPLICATION IN THE ARTS AND THE INDUSTRIES.

Edited from the German with Additions by

**WILLIAM T. BRANNT.**  
495 Pages, Cloth, \$2.00.

Sent, postpaid, on receipt of price, by

**DAVID WILLIAMS, Publisher and Bookseller,**  
96-102 Reade St., New York.

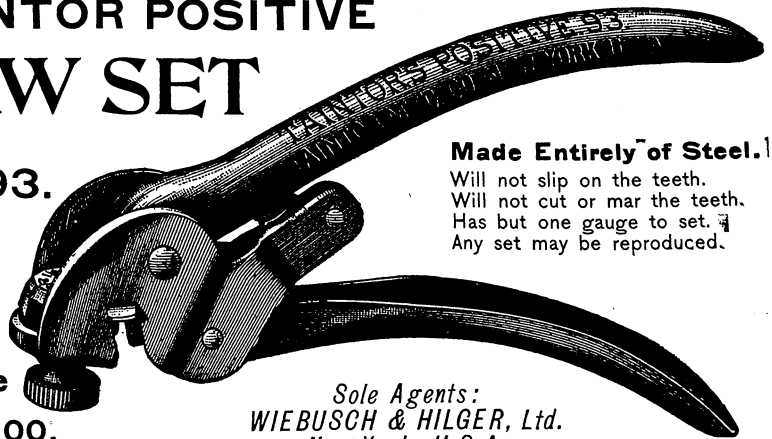


**TAINTOR POSITIVE SAW SET**

No. 93.

Retail

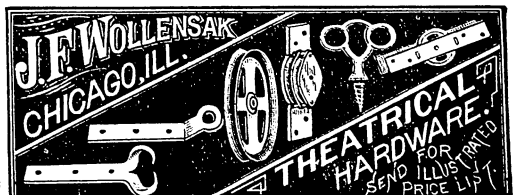
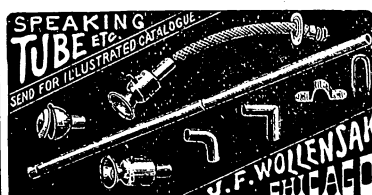
Price  
\$1.00.



**Made Entirely of Steel.**

Will not slip on the teeth.  
Will not cut or mar the teeth.  
Has but one gauge to set.  
Any set may be reproduced.

Sole Agents:  
**WIEBUSCH & HILGER, Ltd.**  
New York, U.S.A.



GEO. N. CLEMONSON, PRES.

S. S. BATTIN, Vice-Pres.

ROBERT J. JOHNSON, Treas.

F. B. EARLE, Sec.

# THE NATIONAL SAW CO.,

OPERATING

Wheeler, Madden & Clemson Mfg Co., Wood-  
rough & McParlin, Richardson Brothers, Har-  
vey W. Peace Co., Monhagen Steel Works, Wood-  
rough & Clemson, Pennsylvania Saw Co.

SEND FOR PRICE-LIST.

GENERAL OFFICE:

NEWARK, - - New Jersey.

# SAWS

## WENTWORTH'S PATENT NOISELESS SAW VISES, WITH RUBBER CUSHIONED JAWS.

Prevent all vibration and render Saw Filing noiseless.  
Will make no more noise than Filing on a Solid Piece of  
Iron.

Have a Larger Sale than All Other Kinds Combined.

## PRICE LIST.

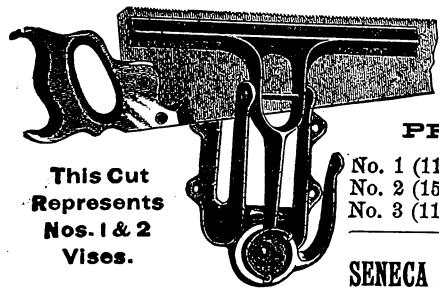
No. 1 (11 inch Jaws),	-	PER DOZ.
No. 2 (15 inch Jaws),	-	\$15.00
No. 3 (11 inch Jaws),	-	21.00
	-	18.00

## LIBERAL DISCOUNT TO THE TRADE.

LONGEST JAWS, HEAVIEST AND  
BEST FINISHED.  
Sold by all leading jobbers of gen-  
eral Hardware at Factory Prices.

—MANUFACTURED BY—

SENECA FALLS MFG. CO., 255 Water St., Seneca Falls, N. Y.



This Cut  
Represents  
Nos. 1 & 2  
Vises.



No. 3 Vise.

## E. C. ATKINS & CO., Indianapolis, Ind.

BRANCH HOUSES:  
Memphis, Tenn.  
Minneapolis, Minn.  
Chattanooga, Tenn.

### Circular, Band, Cross-Cut and Hand Saws.

Diamond.  
Rex.  
American.

Dexter.  
Lance.  
Columbian.



### ORIGINAL TUTTLE TOOTH.

THE BEST SAW IN THE WORLD FOR THE MONEY.



Fine Steel, Patent Temper.

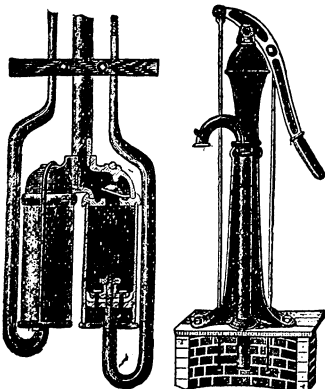
Furnish your Trade with the Best Saws.

The ATKINS Saws Lead them all.

Write for Price-List and Trade Prices.

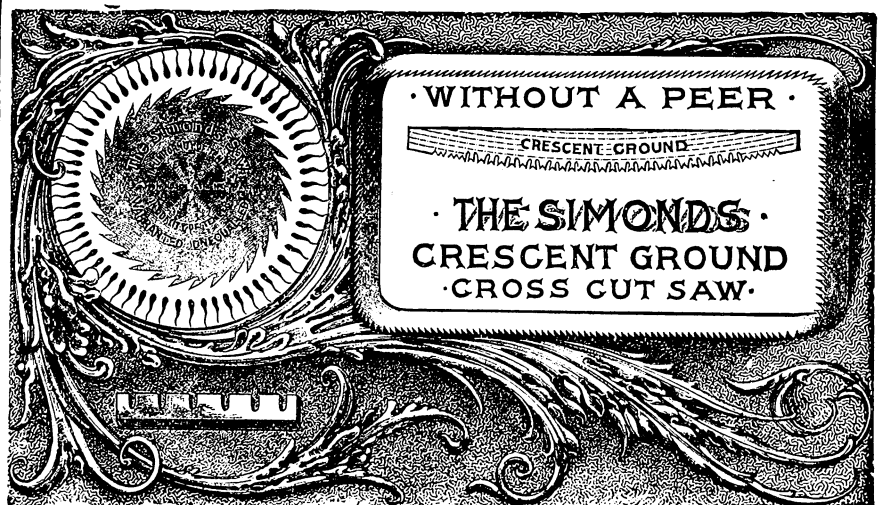
### Peters Double Cylinder Force Pump.

EASIEST WORKING PUMP IN THE MARKET.



Will send any responsible dealer a sample  
to be returned in 30 days if not perfectly  
satisfactory.

WRITE FOR CIRCULARS AND PRICES.  
PETERS PUMP CO., - KEWANEE, ILL.

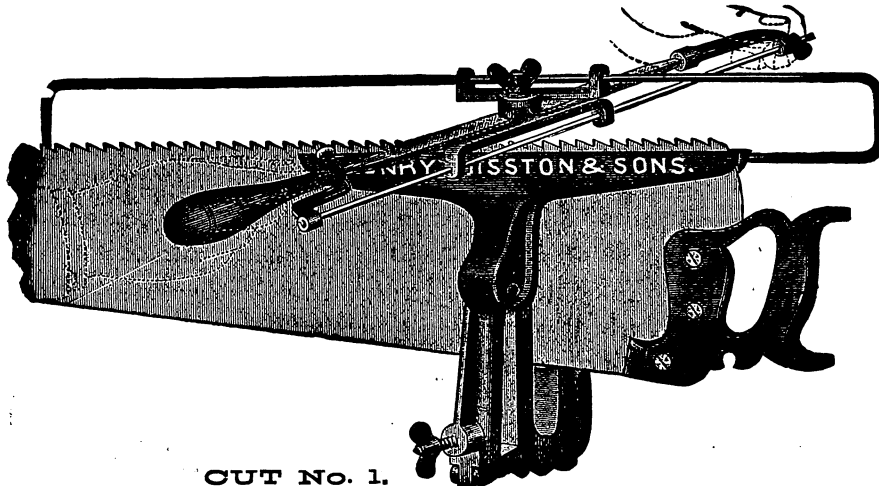


Simonds Mfg. Co. Simonds Saw Co.  
FITCHBURG, MASS. CHICAGO, ILL. SAN FRANCISCO CAL. PORTLAND, ORE.



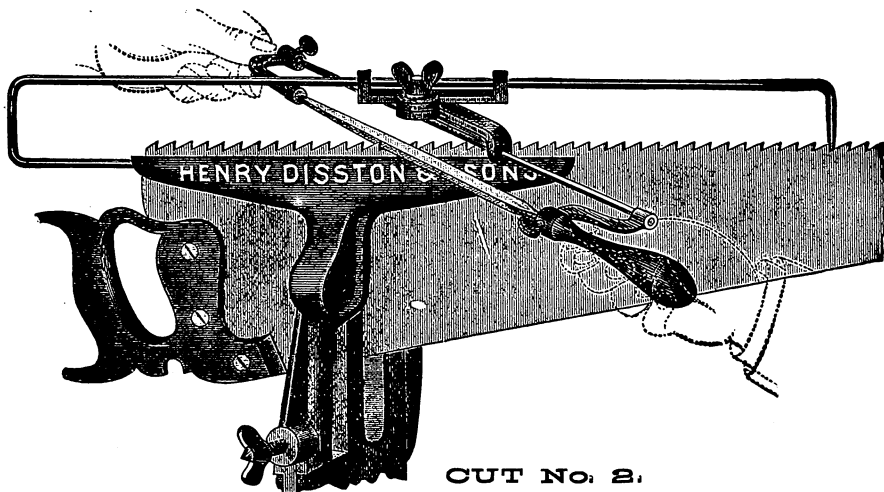
# DISSTON'S Improved Saw Clamp AND FILING GUIDE.

ESPECIALLY DESIGNED TO ASSIST THOSE NOT SKILLED IN THE ART  
OF SAW FILING TO FILE A SAW CORRECTLY.



CUT No. 1.

Cut No. 1 shows a saw and the attachment in proper position for filing the first side; and Cut No. 2 shows the saw and attachment reversed and in position to file the second side. There are three marks on one of the hubs of the swivel attachment, and one mark on the other. One of the three marks shows when it is in position No. 1, and the other designates when it is in position as shown in No. 2. The third, or centre, marks show when it is in position for filing Rip Saws.



CUT No. 2.


To obtain the correct position, loosen the wing nut and move the guide around to the point desired; after tightening wing nut, loosen screw in file handle, then turn handle until file gives the shape tooth wanted.

A good way is to select a tooth of correct shape and let file down into it, tighten set screw in handle, then file a tooth to see if the shape suits. If not turn the file a little to the right or left and try another tooth until the proper shape is obtained. Then file every other tooth, see cut No. 1; when one side is filed, reverse saw and attachment and adjust as in No. 2, and file the other teeth. For Rip Saws, place the file at right angles with the saw and file every tooth. Always keep the file as nearly horizontal as possible.


This filing guide is sold only attached to our No. 3 Improved Clamp or Vise, and not sold separately. We recommend this as the best saw clamp on the market, being quickly and easily adjusted, and not liable to get out of order.

Write for price including No. 3 Clamp, Filing Guide, File and Handle complete: Packed one in a wooden box.

**Henry Disston & Sons, Philadelphia, Penn.** INCORPORATED.



# ARCADE FILE WORKS.



## WARRANTED FILES AND RASPS.

**EASTERN OFFICE.**  
**NEW YORK.**

**FACTORY.**  
**ANDERSON, IND.**

**WESTERN OFFICE.**  
**CHICAGO.**

## THE FILES **THAT LEAD** THEM ALL

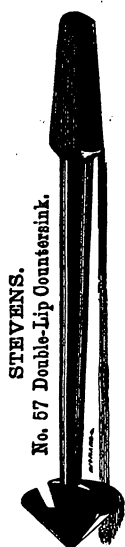
**THE BEST EQUIPPED FILE WORKS IN THE WORLD.**

The fact that the Arcade File Works alone use the improved File Machinery recently invented by Alfred Weed, and the even heat of natural gas, enables them to produce files that cut faster and wear longer than any on the market.

### Patent Double Lip Countersink.

**The Fastest and Best Cutting Tool Made.**

It can be sharpened to a keen edge, so that it will cut perfectly smooth in any kind of wood, and not leave the wood on the surface torn or rough. It will clear itself of its shavings, leaving the edge free to cut. This is the only double lip, self-centering Countersink for wood which is a sharp edge tool, and is made by the only true principle for a perfect working Countersink. They are made from the best of steel, forged and twisted, *strong and durable*; can be easily sharpened from the inside. These Countersinks are now in use in many of the largest Railway Car, Coach and Carriage Manufactories, by Carpenters, Pattern Makers, etc.



5/8 in., 35c. 7/8 in., 40c.

### Finest Mechanical Tools.

Send for  
Catalogue of  
Complete Line.

### Steel Rules.



The Flexible Rules of very thin watch spring tempered steel, represented in above cut, are graduated in 32ds and 64ths on one side only, from 1 inch to 12 inches in length. These rules are invaluable to all fine workmen for measuring irregular surfaces.



**J. STEVENS ARMS & TOOL CO.,**  
**CHICOPEE FALLS, MASS.**

P. O. Box 5729.



## THE Piqua Handle & Mfg. Co.,

— Manufacturers of —

**FARMING TOOL HANDLES, GARDEN RAKES,**

**“Piqua” Natural Wood Lock Furniture,**

Base Knobs, Electric Push Buttons and kindred goods.

Write for Prices and Catalogue.

**PIQUA, O.**





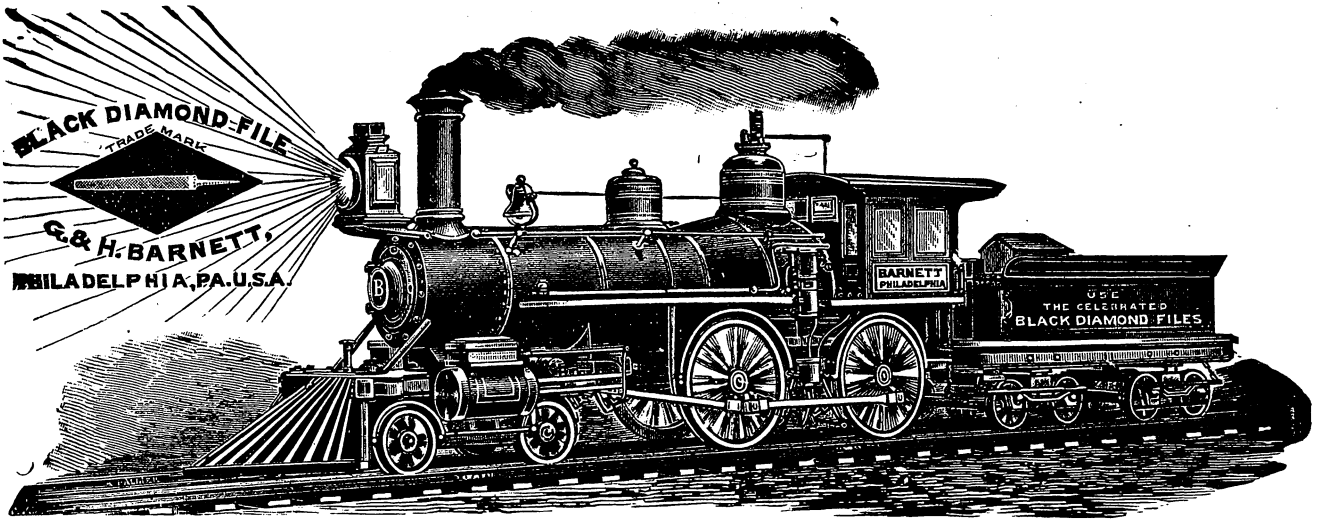


A practical means of rapidly reaching absolutely accurate results without the mental wear of computing.

# LADD'S DISCOUNT BOOK.

It gives at a glance the net of any sum at a great range of discounts, simple and complex, and it is accurate, rapid and practical. Price, \$3.00; Double Indexed Edition, \$4.00.

Mailed, postpaid, upon receipt of price by **DAVID WILLIAMS, 96-102 Reade Street, New York.**



THE LARGEST AND MOST COMPLETE FILE WORKS IN THE WORLD.

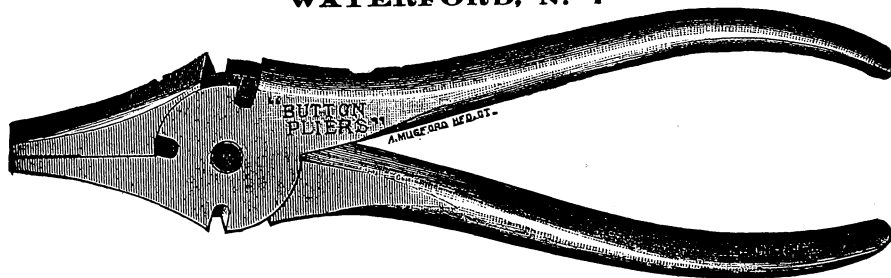
# NICHOLSON FILE CO.

PROVIDENCE, R. I.

3000 VARIETIES FILES [X.F.] AND INCREMENT CUT FILES

J. M. KING & CO.,  
WATERFORD, N. Y

Manufacturers of  
BUTTON'S



Pat. Wire Cutter  
AND PLIER COMBINED.

Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and MACHINISTS' STOCKS and DIES, PLUG and TAPER TAPS, HAND, NUT and SOREW TAPS, PIPE TAPS and REAMERS.

Price-List on Application.

Established by DANIEL B. KING, 1829.

Philadelphia, 1876.



McCaffrey File Co.,  
FIFTH and BERKS STS.,  
PHILADELPHIA, PA.

For Superiority.



HOWARD IRON WORKS.  
BUFFALO, N. Y.

Manufacturers of

BENCH VISES.

Price Lists sent on application.

Manufacture and keep in stock a full line of FILES and RASPS only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

BEST  
CRUCIBLE  
STEEL.  
—  
STRONGEST  
OOTH

"TROJAN" HORSE RASPS AND FILES.



BANKER & WHITE,  
(Troy File Works.)

TROY, N. Y.

N. Y. Agent, GEO. M. MATTESON, 111 Duane St.

LOWEST  
IN  
PRICE.  
—  
LET  
US  
QUOTE.

3 NICKLE, Silver and Bronze Metallic Figures and Letters, Sizes 1/4 in to 3 in. Pattern Letters, Steel Stamps, Brands, Dies &c. Send for Reduced Price List. We make a specialty of the Hardware Trade. A. A. WHITE & CO., Providence, R.I.

IT PAYS HIM.

It always pays the Hardware Dealer to have neat and attractive Wooden Shelf Boxes. With samples on the front they save the salesman's time and attract the customer's money. Everybody knows this, but everybody has not yet sent for our Catalogue and proof. We have Wire Stitched Folding Paper Boxes for manufacturers; other Paper Boxes for every use, and Wooden Shelf Boxes as above. Write to

JESSE JONES & CO.,  
615 and 617 Commerce St., Philadelphia.



# John Wilson's Butchers' Knives and Steels, Skinning, Sticking, Farriers' & Shoe Knives,

Have established and maintained their reputation for superiority  
against all Competitors, from

**THE YEAR SEVENTEEN HUNDRED & FIFTY,**  
and are still in increasing demand. As in the past, it is the unalterable  
**DETERMINATION OF THE HOUSE TO SEND OUT NOTHING BUT WHAT IS OF THE HIGHEST POSSIBLE QUALITY.**  
WORKS: SYCAMORE STREET, SHEFFIELD, ENGLAND.

**SOLE AGENTS FOR THE UNITED STATES,**  
Messrs. Hermann Boker & Co., 101 and 103 Duane St., New York.

## As a Labor Saver

There is no single thing in the line of hardware  
equal to the

### AMIDON CORNER BRACE.

The Amidon Tool Corporation,  
Manufacturers of  
A Complete Line of Bit Braces,  
1451 Niagara St., Buffalo, N. Y.

CORNER BRACE.

**AMERICAN TOOL COMPANY,**  
NEW YORK,  
MANUFACTURERS OF  
**TOOL CHESTS**

Of all sizes, complete with tools, for Hardware, Toy,  
Notion and Variety trades.  
Factory and Salesroom.

200 West Houston Street, near Varick.  
Also Machinists' Tool Chests, empty. Illustrated Cata-  
logue and prices furnished on application.

## F. S. HUTCHINSON CO.,

Paragon Self-Retaining Dumb Waiters,

HAND AND BELT POWER ELEVATORS,

Aldrich Building, 32 Warren Street,  
NEW YORK.

## CATALOGUES AND QUOTATIONS

Our System for Filing is the Simplest  
and Most Complete. Write for De-  
scriptive Matter, Price-List and  
Testimonials.

The Folding Paper Box Co.,  
SOUTH BEND, INDIANA.

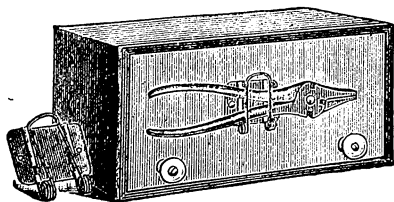
We make all kinds of Paper Boxes, Cartons, Fold-  
ing Boxes and Regular Work.

## THOMAS CLARKE

**HARDWARE AND GENERAL AGENT.**

(FIRST-CLASS REFERENCES.)

60 PRINCE WILLIAM ST., ST. JOHN,  
NEW BRUNSWICK.



PAT. APPLIED FOR.

**SHOW**

Your goods by sample. Save time and avoid  
loss from shopworn samples by using Thomp-  
son's Sample Holder.

—Manufactured by—

**MASSEY & THOMPSON, Monroe City, Mo.**

Write for prices or send 5c. for a sample.

ESTABLISHED 1816.

**WHITE, VAN GLAHN & CO.,**

CHATHAM SQUARE, NEW YORK,

**HARDWARE  
JOBBER,**

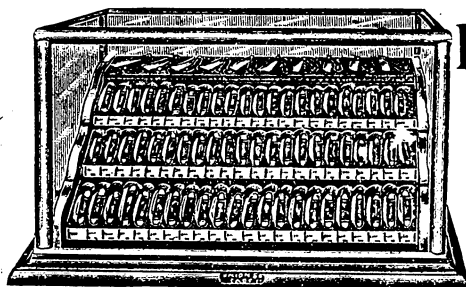
Carry a full line of  
Lowentraut's Skates,  
Special Pattern Axes,  
Coal Hods, Elbows, Stove Boards,  
"Flexible Flyer" Sleighs and all  
Seasonable Goods.

—WRITE FOR PRICES.—

SOLE U. S. AGENTS FOR

**J. B. Addis Wood Carvers' Tools.**

## THE "DEMPSEY" PATENT CUTLERY Display Case.



Patented October 3d, 1893.

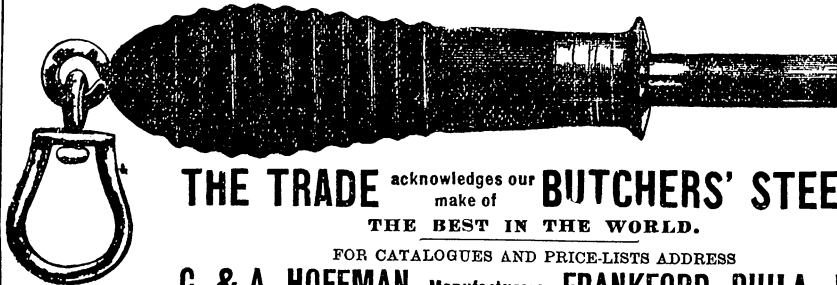
Convenient, Attractive, Clean. Saves  
Time and Money. Increases Sales.  
Preserves and Protects Stock.  
You Can Get One Without  
Cost Through Our  
Agents.

**UNION SHOW CASE COMPANY, Chicago, Ill.**

The Following Leading Firms are Authorized Agents:

Horton, Gilmore, McWilliams & Co., Chicago, Ill.  
Dane, Stoddard, Kendall & Co., Boston, Mass.  
F. A. Koch & Co., New York, N. Y.  
A. R. Justice & Co., Philadelphia, Pa.  
Henry Keldell & Co., Baltimore, Md.  
The Wm. Bingham Co., Cleveland, Ohio.  
Speer Hardware Co., Fort Smith, Ark.  
Dixon, Bergeson & Co., Portland, Oregon.  
Henry Sears & Co., Chicago, Ill.  
John Fritzlauff Hdw. Co., Milwaukee, Wis.  
Farwell, Ozmun, Kirk & Co., St. Paul, Minn.  
Fletcher Hardware Co., Detroit, Mich.

Baker & Hamilton Hardware Co., San Francisco, Cal.  
Kirkpatrick Hardware Co., Atlanta, Ga.  
W. C. Belknap & Co., Louisville, Ky.  
A. F. Shapleigh Hdw. Co., St. Louis, Mo.  
The Wyeth Hardware & Mfg. Co., St. Joseph, Mo.  
Rogers & Baldwin Hdw. Co., Springfield, Mo.  
McGregor-Noe Hdw. Co., Springfield, Mo.  
Wells & Neilegar Co., Chicago, Ill.  
Wadsworth & Matheson, Jacksonville, Ill.  
Van Camp Hardware & Iron Co., Indianapolis, Ind.  
The Way Hardware Co., Hartford, Conn.  
Alfred Ely & Co., Baltimore, Md.  
E. F. W. Meier, St. Louis, Mo.



**THE TRADE** acknowledges our  
make of **BUTCHERS' STEELS**  
**THE BEST IN THE WORLD.**

FOR CATALOGUES AND PRICE-LISTS ADDRESS

**C. & A. HOFFMAN, Manufacturers, FRANKFORD, PHILA., PA.**

**BOOKS.**

YOU CAN OBTAIN PROMPTLY the latest  
work on any subject in which you are  
interested by addressing **DAVID WILL-**  
**IAMS, Publisher and Bookseller, 96-102 Reade Street, New York.**

"Stamped with the BUCK'S HEAD."

## BUCK BROTHERS, MILLBURY, MASS.

The Most Complete Assortment in the U. S. of  
Shank, Socket Firmer and Socket Framing  
Chisels, Fine Bevel Edge Chisels, Plane Irons.

## TWO PRIZE MEDALS,

No. 1098 and No. 1099, AT WORLD'S FAIR.



TRADE-MARK.

Buyers are cautioned against any parties who claim a recent connection (or any connection for over 20 years) with Buck Bros., or who represent goods as our make not stamped with the BUCK'S HEAD or BUCK BROTHERS in full.

ESTABLISHED, 1825.

**R. HEINISCH'S SONS CO., NEWARK, N. J.**

INCORPORATED, 1892.

New York Office, No. 90 Chambers Street.



Tailors' Shears, Trimmers, Scissors,  
Tinnern's Snips, &c.

CATALOGUES AND PRICES ON APPLICATION.

We have no contract with Messrs. Hermann Boker & Co. as Agents for the sale of our goods.

HIGHEST AWARD PARIS EXPOSITION, 1889.

ESTABLISHED 1837.  
INCORPORATED 1892.



**THE L. & I. J. WHITE CO.,**  
BUFFALO, N. Y.

MANUFACTURERS  
OF

**EDGE TOOLS.**

Coopers', Carpenters' and Ship Tools, Plane Irons,  
Cleavers, &c. Full Line Chisels.

1853

1894

Highest Awards at the World's Exposition for Superior Tools.



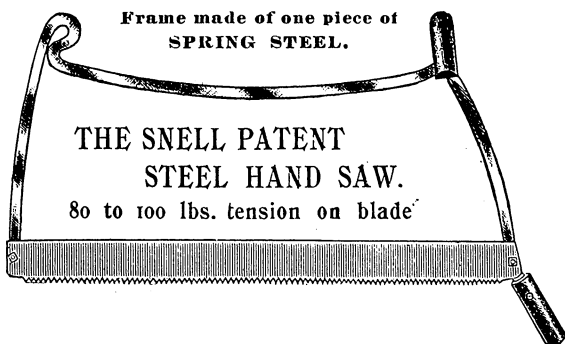
## CHARLES BUCK,

sole surviving member of the original firm of BUCK BROS., and proprietor of the  
**MILLBURY EDGE TOOL WORKS, MILLBURY, MASS.,**  
Manufacturer of the

## GENUINE STANDARD BUCK TOOLS.

All kinds of Shank, Socket Firmer Chisels and Gouges, Cut and Double Irons, S. D. Bits, etc. Send for Catalogue. CAUTION.—Buyers wanting the standard Buck Tools will see that they get only those stamped CHARLES BUCK when ordering from the jobbing houses. Address all correspondence to CHARLES BUCK or the

Millbury Edge Tool Works, Millbury, Mass.



Frame made of one piece of  
SPRING STEEL.

THE SNELL PATENT  
STEEL HAND SAW.

80 to 100 lbs. tension on blade

This saw is always  
ready for use. Never  
has to be adjusted after  
blade is put in. Will  
last a life-time.

Send for Descriptive Circular  
and Prices to

**Butler Mfg. Co.,**

P. O. BOX 2180,

BOSTON, MASS.

WILL NOT BEND NOR BREAK.

FACTORY, 330 to 338 First Street, So. Boston.

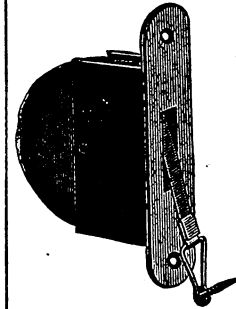
## Cast Shears.

ACME SHEAR CO.,

BRIDGEPORT, - CONN.

## PULLMAN Steel Frame Sash Balance.

Oldest and largest producers of a perfect working Spring Sash Balance in the world. Every Balance warranted. Require no box frames. Our prices lowest, our Balance the best. For sale by all leading Hardware dealers in the United States.



Write for Prices.

PULLMAN SASH BALANCE CO., Rochester, N. Y.

New York Office, 142 Chambers St.

Chicago Office, 235 Lake St.

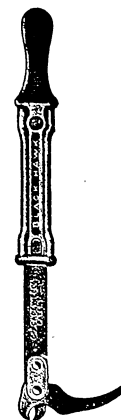
IF YOU WANT THE BEST  
FOR CATALOGUE & PRICES  
THEIR MAKE IS EQUAL TO ANY OTHER  
IF NOT SUPERIOR  
HAVE BEEN IN BUSINESS SINCE 1840.  
**BOARDMAN & SON**  
BRITANNIA SPOONS

IF YOU WANT THE BEST  
FOR CATALOGUE & PRICES  
THEIR MAKE IS EQUAL TO ANY OTHER  
IF NOT SUPERIOR  
HAVE BEEN IN BUSINESS SINCE 1840.  
**BOARDMAN & SON**  
NICKEL SILVER SPOONS

IF YOU WANT THE BEST  
FOR CATALOGUE & PRICES  
THEIR MAKE IS EQUAL TO ANY OTHER  
IF NOT SUPERIOR  
HAVE BEEN IN BUSINESS SINCE 1840.  
**BOARDMAN & SON**  
SILVER PLATED SPOONS

## A POLITICAL PULL

Is a good thing to have if



it works. It's no  
use in opening  
boxes. You need  
for that work a  
**BLACK HAWK  
NAIL PULLER.**

Of all jobbers  
at \$12 a doz.

American Specialty Co.,  
HARTFORD, CONN.

Depreciation of Factories, Mines and Industrial Undertakings and their Valuation.  
By EWING MATHEWSON. Second edition. 143 pages, 8vo, cloth..... \$3.00  
For sale by David Williams, 96-102 Reade St., N.



**THE LATEST.**

**THE VICTORIA.**

We have a full line of above, which is the neatest pattern ever presented to the trade, and it is stamped



NONE GENUINE WITHOUT THIS TRADE-MARK.

**WM. ROGERS MFG. CO.,** Offices, **Hartford, Conn.**  
 FACTORIES HARTFORD, CONN., NORWICH, CONN., AND TAUNTON, MASS.

## Quality or Price?

Don't sacrifice quality for price. Don't pay too much for quality. You do neither by buying of us. The name of a reliable manufacturer on goods is worth more than it costs.



Send for  
folders.

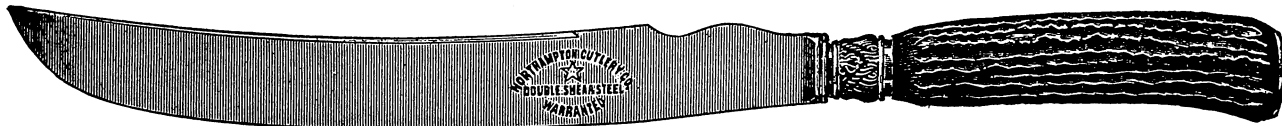


Leader Tea Spoon  
FULL SIZE.

**THE HOLMES & EDWARDS SILVER CO.,** - - Bridgeport, Conn

## NORTHAMPTON CUTLERY CO.,

NORTHAMPTON, MASS., and 122 CHAMBERS ST., NEW YORK.



WE CALL ESPECIAL ATTENTION TO OUR COMPLETE LINE OF FINE GOODS IN RUBBER, CELLULOID, BONE, IVORY, &c.

— OUR CLAIMS ARE: —

EXTRA QUALITY OF STEEL IN BLADES.

SUPERIORITY IN GRINDING AND FINISH.

STRENGTH AND DURABILITY

Made in Plain Steel or Heavily Plated Blades, Hand Burnished.

## Excelsior Cutlery Co. (Swedish Razor Co.).

WORCESTER, MASS.,

Are making the best

# RAZORS

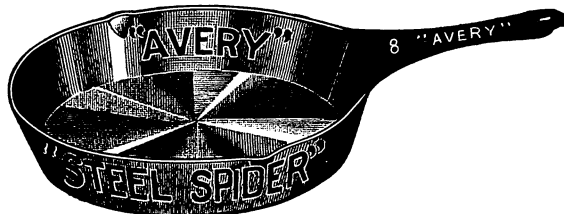
in the world.

**EVERY ONE HAND FORGED, TESTED AND WARRANTED.**

This is the only factory in the United States making }  
 Razors by hand from beginning to end. } **Send for Price.**



Steel  
Spiders,  
Griddles,  
Kettles,  
Maslins,  
Scotch Bowls,  
Stew Pots,  
Stew Pans,  
Etc.



The Avery Stamping Co.,  
Cleveland, Ohio.

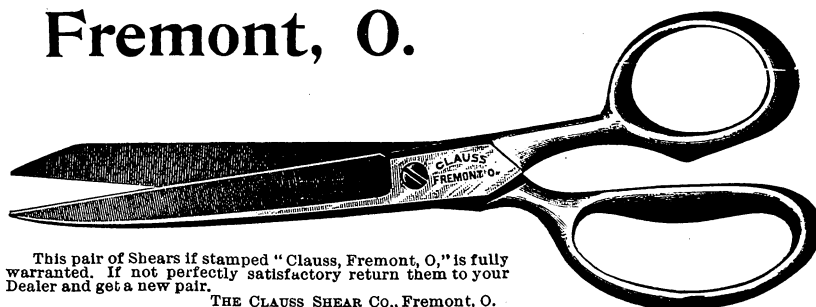


This is a fac-simile of the label on my VULCAN TOOL CO. brand of HATCHETS; a brand for which I have a regular trade in some sections, but to those who have not "caught on"—dealers who are handling an outside brand—I offer a limited quantity at a very low price. Inquiries for price solicited.

FAYETTE R. PLUMB, Philadelphia.

Fremont, O.

# Clauss



This pair of Shears if stamped "Clauss, Fremont, O." is fully warranted. If not perfectly satisfactory return them to your Dealer and get a new pair.

THE CLAUSS SHEAR CO., Fremont, O.

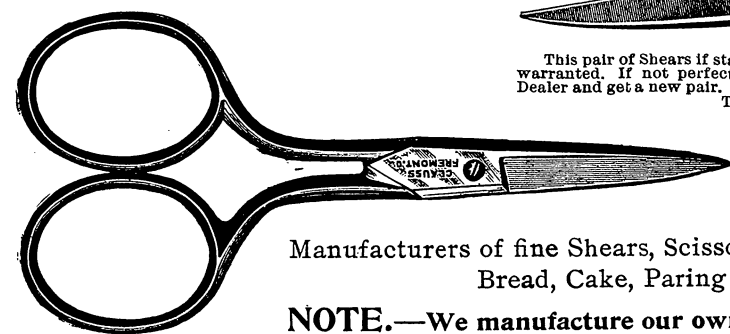
THE CLAUSS SHEAR CO.,

Fremont, O., U. S. A.,

New York Office, 100 Chambers Street

Manufacturers of fine Shears, Scissors, Tinnors' Snips and The Celebrated Clauss Bread, Cake, Paring and the Perfect Carving Knives.

NOTE.—We manufacture our own Scissors.



CHRISTY BREAD KNIFE  
PATENTED

There are imitations and counterfeits with cast handles—cheap, but not good. Reputable dealers will not impose upon their patrons knowingly. Ask your wholesale dealer for prices. It pays to be posted on the "Christy."

THE CHRISTY KNIFE CO., Makers,  
Fremont, O., U. S. A.

New York Office, 64 Reade Street,  
David Eastman, Manager.

## NICHOLS BROTHERS, Greenfield, Mass., U. S. A.

BUTCHER KNIVES, CLEAVERS, STEELS, ETC.

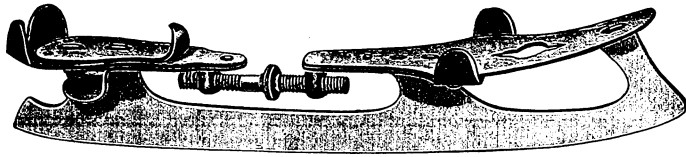
Trade Discounts and Catalogue on Application.

BUTCHERS ALL WANT THEM.



# SICKELS, SWEET & LYON,

## WHOLESALE HARDWARE,



Office 35 Barclay Street,  
Warehouse, 40 Park Place,

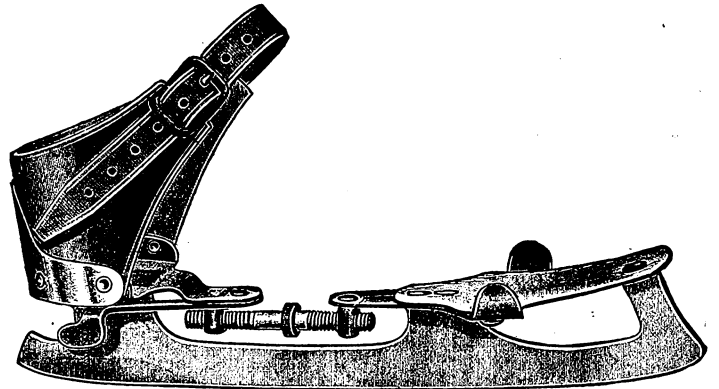
**NEW YORK.**

NEW YORK

SELLING AGENTS

FOR

# Winslow's Skates.



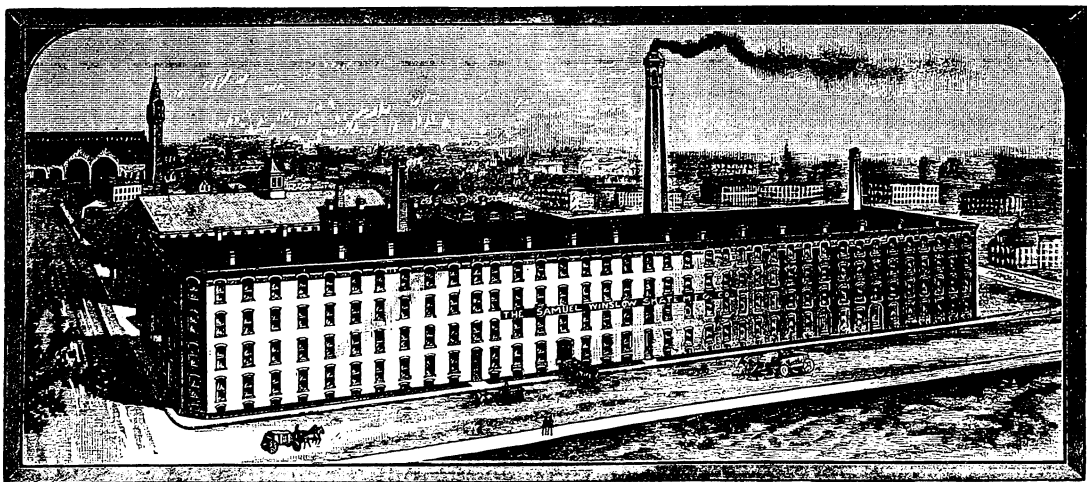
Agents or Union Steel Screw Co.

“ “ Eagle File Co.

# The Samuel Winslow Skate Manufacturing Co.,

WORCESTER, MASSACHUSETTS.

Established 1856.



# The Largest Producers of Ice and Roller Skates in the World.

# THE AMERICAN AXE AND TOOL CO.,

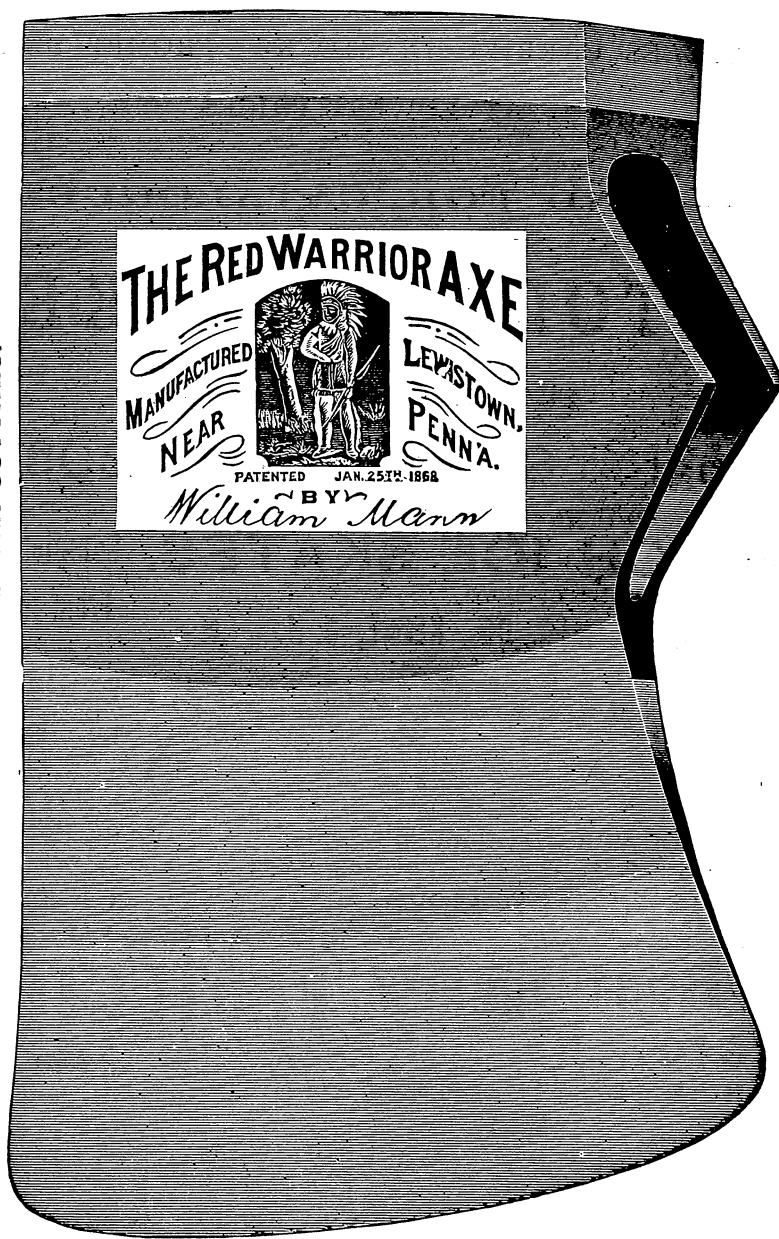
253 Broadway, - - - NEW YORK.  
**TELEPHONE, 1023 CORTLANDT.**

Manufacturers of

BLOOD, HUNT, LIPPINCOTT, RED WARRIOR, MANN, HURD, PEERLESS, JAMESTOWN,  
 ROMER, FRANCIS, SHARPS, UNDERHILL, STEWART,

Brands of

AXES, HATCHETS, BROAD AXES and ADZES, also "Blood's" Champion and  
 "Hubbard's" Diamond Blade SCYTHES.



Grass Hooks, Corn Knives, Bush Hooks, Planters' Eye Hoes, Ice Axes, Ice Hatchets and  
 Firemen's Axes, Wood Chisels, Picks, Mattocks, Brick Hammers, Box Openers, Ice Chisels, Butchers'  
 Handled Axes, Meat Hatchets.

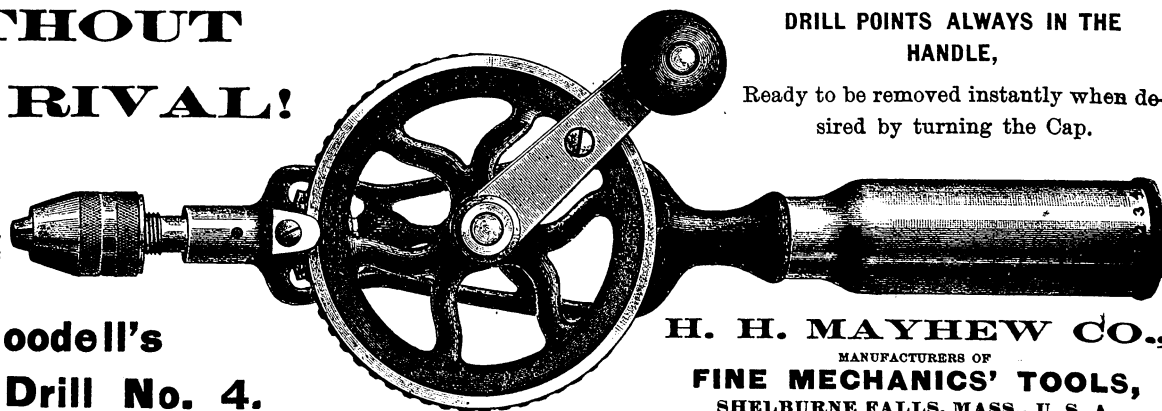
**ALWAYS IN STOCK:** Best Leading Brands of Axes and Edge Tools. Cheap Handled  
 Axes. Medium Grade Axes. Boys' and Hunters' Axes. **Job Lots of Axes, all Grades  
 and Patterns.**

ADDRESS ALL CORRESPONDENCE TO NEW YORK OFFICE.

## WITHOUT A RIVAL!

A MODEL  
**CHUCK.**

Holds any Twist  
 Drill from 5-32  
 down to No. 80.



DRILL POINTS ALWAYS IN THE  
 HANDLE,

Ready to be removed instantly when de-  
 sired by turning the Cap.

**Goodell's  
 Hand Drill No. 4.**

**H. H. MAYHEW CO.,**  
 MANUFACTURERS OF  
**FINE MECHANICS' TOOLS,**  
 SHELburne FALLS, MASS., U. S. A.

Drills for Wood  
 & Metal, Counter-  
 sinks, Screw  
 Drivers, Chucks,  
 &c., for sale by  
 the trade.

**Syracuse Twist Drill Company,**  
 SYRACUSE, N. Y.



Every tool fully  
 Guaranteed.  
 Beware of im-  
 itations.



# WINSLOW'S ICE SKATES.

ALL STYLES CARRIED IN STOCK. PROMPT SHIPMENTS  
AT LOWEST PRICES.

—SEND FOR CATALOGUE.—

## DAME, STODDARD & KENDALL,

SELLING AGENTS.

374 Washington Street, - BOSTON, MASS.

**LONG REACH ICE SKATES.** Complete Line of Ice Skates,  
From the Cheapest to the Finest.

MANUFACTURED BY  
KEENE MFG. CO., KEENE, N. H.



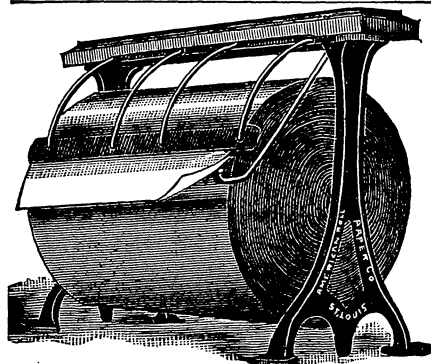
BIGELOW & DOWSE CO., General Agents,  
229 FRANKLIN STREET, - BOSTON, MASS.  
SEND FOR 1894 CATALOGUE.

—AGENTS.—

The McIntosh-Huntington Co., Cleveland, Ohio.  
Jay A. Rickard, Schenectady, N. Y.  
Smith, Lyon & Field, New York, N. Y.  
Standart Bros., Detroit, Mich.  
Supplee Hardware Co., Philadelphia, Pa.  
The Henry Sears Co., Chicago, Ill.  
Weed & Co., Buffalo, N. Y.  
Farwell, Ozmun, Kirk & Co., St. Paul, Minn.  
A. F. Shapleigh Hdw. Co., St. Louis, Mo.

## Yacht AND Boat Hardware.

L. W. FERDINAND & CO.,  
BOSTON, MASS.  
Send for 226-Page Catalogue.



**THE ECONOMIC  
HOPKING ROLL PAPER CUTTER.**  
Made in all sizes, 6 to 36 inches, at \$1.50 each.  
Japan and Hardwood Finish.  
Made by the  
**American Roll Paper Co.,**  
St. Louis, Mo.

**Boxes Made Absolutely Secure  
BY USING THE PORTABLE  
BOX BANDER**  
ONE MAN CAN BAND  
YOUR BOXES QUICKER THAN TWO  
MEN CAN IN ANY OTHER WAY.  
HOOP-IRON, WIRE OR ANY OTHER FLEXIBLE MATERIAL CAN BE USED EQUALLY WELL. Send for price  
J.W. GOODELL - BURLINGTON, VT.

## THE NEW "PROTECTOR" REVOLVER

A 7-SHOT, 32 CALIBRE, STANDARD CARTRIDGES.



SEND FOR  
CATALOGUE.

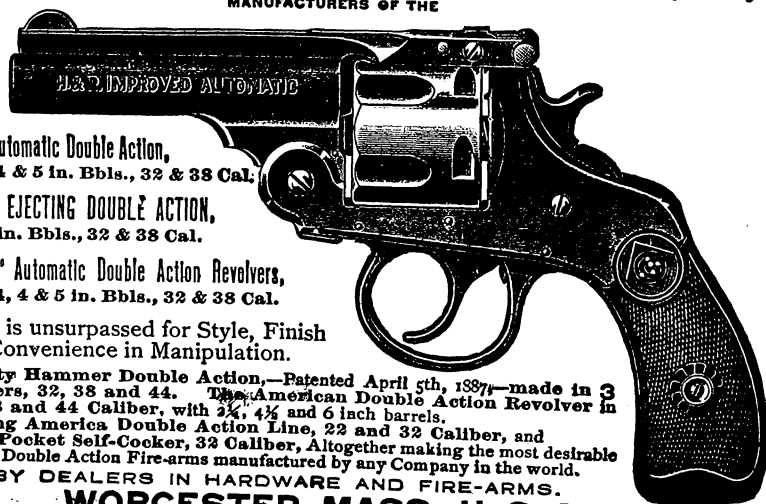
**QUICK! DURABLE!  
COMPACT! EFFECTIVE!**

The most Genteel and Serviceable Rapid Firing Revolver ever manufactured. Carried in the vest pocket as easily as a watch. **Absolutely Safe! Automatic Safety Lock!** An Ideal Weapon for a man to carry. Selling by the Thousand. Elegantly Finished, Neatly Packed in a Box, Price \$6.00. Ask your Dealer for them or send to us.

**CHICAGO FIRE ARMS CO., 637-638 Monadnock Building, CHICAGO, ILL.**

**Harrington & Richardson Arms Company,**

MANUFACTURERS OF THE



Improved Automatic Double Action,  
3 1-4, 4 & 5 in. Bbls., 32 & 38 Cal.

IMPROVED EJECTING DOUBLE ACTION,  
3 1-4 in. Bbls., 32 & 38 Cal.

"Premier" Automatic Double Action Revolvers,  
3 1-4, 4 & 5 in. Bbls., 32 & 38 Cal.

This line is unsurpassed for Style, Finish and Convenience in Manipulation.

The Safety Hammer Double Action, Patented April 5th, 1887—made in 3 Calibers, 32, 38 and 44. The American Double Action Revolver in 32, 38 and 44 Caliber, with 2 1/4, 4 1/2 and 6 inch barrels. The Young America Double Action Line, 22 and 32 Caliber, and The Vest Pocket Self-Cocker, 32 Caliber, Altogether making the most desirable line of Double Action Fire-arms manufactured by any Company in the world.

SOLD BY DEALERS IN HARDWARE AND FIRE-ARMS.

**WORCESTER, MASS., U. S. A.**

# DON'T WAIT —FOR— LOWER PRICES ON WHETSTONES

They will not be affected by the NEW TARIFF,  
for **AMERICAN "GRIT"** needs no Protection, and

## Pike's Whetstones

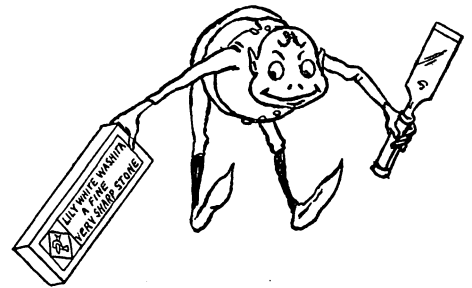
are full of grit. They are sold in every land where sharp  
edge tools are used, and acknowledged BEST.

## PIKE'S LILY WHITE WASHITA

—IS THE—

## Oil Stone

Your customers want.



## OUR STOCK

—OF—

Oil Stones, Razor Hones, Table Hones, Axe Stones,  
Cutlers' Stones, etc., is complete.

## YOUR STOCK

must be low. Bear in mind that the best goods always sell, even  
in dull times.

We want your stock order. **YOU CANNOT AFFORD  
TO PLACE IT ELSEWHERE.**

# The Pike Mfg. Co.,

PIKE STATION, N. H.



### To Make a Bull's Eye In Your Business or at the Range?

If you deal in ARMS or AMMUNITION or shoot a Rifle, Pistol or Shot Gun, you will make a HIT by sending for the IDEAL HAND BOOK.

IDEAL MFG. CO., New Haven, Ct., U. S. A.

Please mention The Iron Age when you write.



### Clipper Bicycles

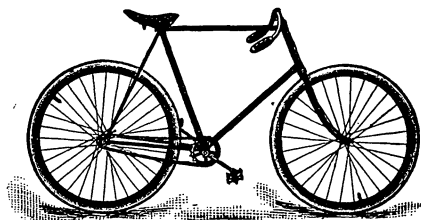
are built to please the dealer and rider.

Are you in the bicycle business? If not, you can make it pay to handle Clippers. Buy direct from the manufacturer and save the jobbers' profit. It will add considerable to your bank account. We want responsible dealers only. We may be able to interest you, in fact we are sure of it. Our policy is a protective one, and will please you. It protects against Scalpers and "Curb Stone Brokers."

**Grand Rapids Cycle Co.,**  
GRAND RAPIDS, MICH.

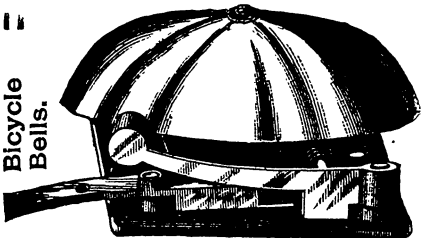
### RIDE A TRIBUNE.

THAT'S THE WHEEL!



Write for Catalogue and Agency.

**THE BLACK MFG. CO., - ERIE, PA.**



Bicycle  
Bells.

BEVIN BROS. MFG. CO., Easthampton, Conn.,  
Manufacturers of

Sleigh Bells, House, Tea Hand, Gong Bells, &c.

### BRIDGEPORT CYCLOMETER. \$3.50.

Registers 1000 miles accurately and repeats, or can be set back to zero at any time. Perfectly Noiseless, Dust Proof and Water Proof. Nothing to get out of order and can be adjusted to any wheel. A high grade cyclometer within the reach of every bicyclist.

**PRICE \$3.50**  
Made in two sizes, viz.: for 28-inch and 30-inch wheels. Send for catalog of sundries. Sold by all bicycle dealers. Cyclometers will be ready for delivery April 1.

The Bridgeport Gun Implement Co.,  
313 and 315 Broadway New York.

## Butcher Knives, Pocket Knives, Carving Knives, Razors, Butchers' Steels, Scissors,

—STAMPED—

## THE W. BINGHAM COMPANY,

CLEVELAND, OHIO.

**ARE THE BEST.**

THE CRAWFORD MFG. CO.

MAKERS OF

HIGH GRADE AND JUVENILE

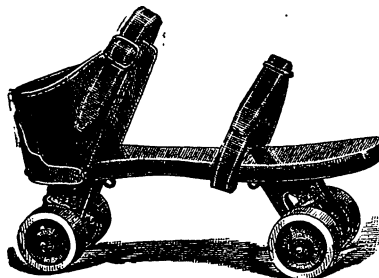
## BICYCLES,

FACTORY, HAGERSTOWN, MD.

NEW YORK OFFICE, 72 READE STREET. L. B. Whymper, Mgr.

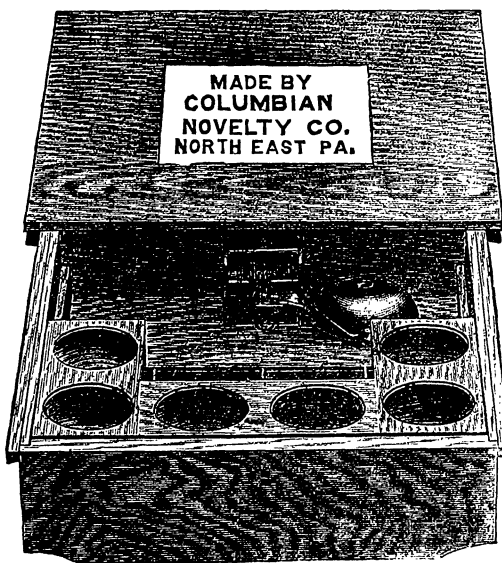
## HENLEY'S - Rink AND Club CELEBRATED

### Roller Skates.



A full, new and complete stock of Roller Skates, Skate Repairs and Rink Supplies. Address for 80 page Catalogue and Prices,

**M. C. HENLEY,**  
RICHMOND, - - IND.



"GEM"

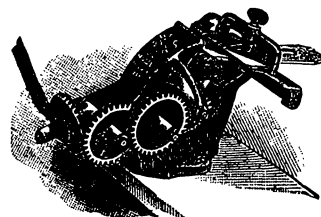
## Alarm Lock Cash Till.

This Cash Till is beyond question the best Till for the purpose on the market, combining as it does a greater number of changes, simplicity and convenience, and above all, superior workmanship and material in its construction.

Packed one-half dozen in crate.

Prices quoted on application.

## CLIPPER GRINDERS.

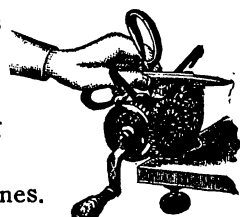


We make five sizes, Nos  
1, 2, 3, and 5.

No. 1 for joiners' use.

Nos. 2 and 3 for grinding  
scissors and knives.

Nos 4 and 5 power machines.



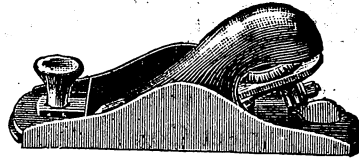
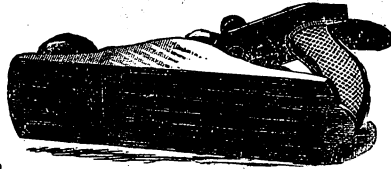
SEND FOR SPECIAL CIRCULAR TO

**THE A. J. TRACY CO., Lim.** - 18 Cliff St., New York, N. Y.



# CARPENTERS' AND MACHINISTS' TOOLS.

Chaplin's Pat.  
Iron Planes,  
Corrugated  
Bottoms,  
Checkered  
Rubber Handles.



Chaplin's Block  
Planes, Solid  
and Adjustable  
Throats.  
Nickel and  
Japan Finish.

## TOWER'S CHAMPION SCREW DRIVERS.

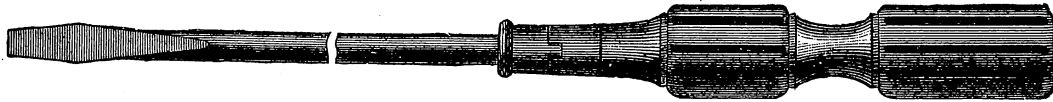
The Fluted  
Handle Gives  
the Best  
Possible Grip.



CHAMPION CABINET SCREW DRIVER.

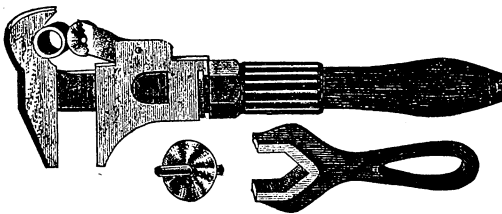


CHAMPION SCREW DRIVER.

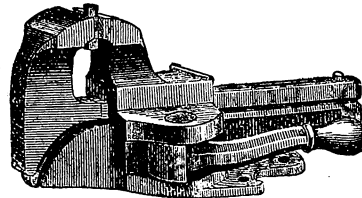


CHAMPION MACHINISTS' SCREW DRIVERS.

ENGINEERS'  
WRENCHES,  
SHORT AND  
LONG NUTS  
AND WITH  
PIPE  
CUTTERS.



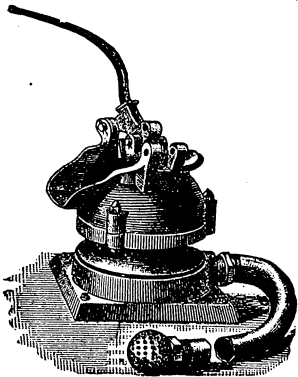
STEPHEN  
VISES,  
STATIONERY  
AND  
SWIVEL  
BASES.



ALSO PLUMB  
BOBS,  
TRAMMEL  
POINTS,  
LEVELS  
OILERS  
WRENCHES, &c

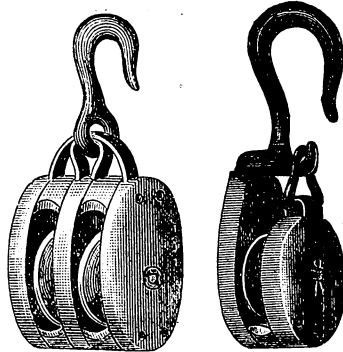
TOWER & LYON, Manufacturers, - - 95 Chambers St., New York.

## TACKLE BLOCKS, GUN IMPLEMENTS, DOG COLLARS, ICE AND ROLLER SKATES, MALLETS, ETC.

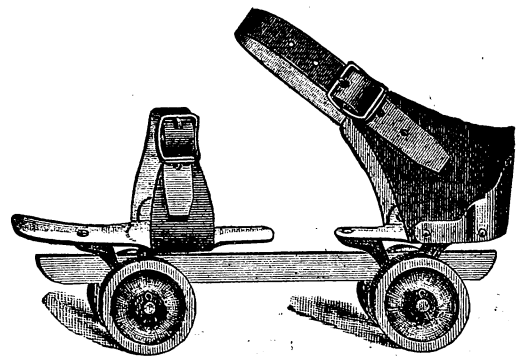


Loud's Patent

SUCTION PUMPS. TACKLE BLOCKS.



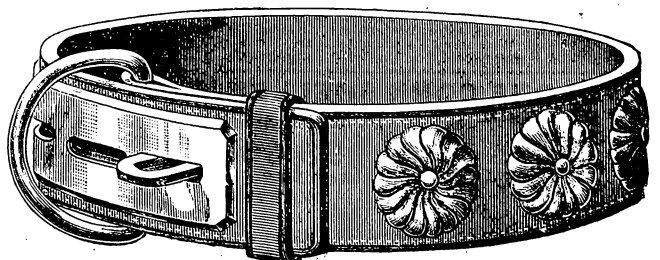
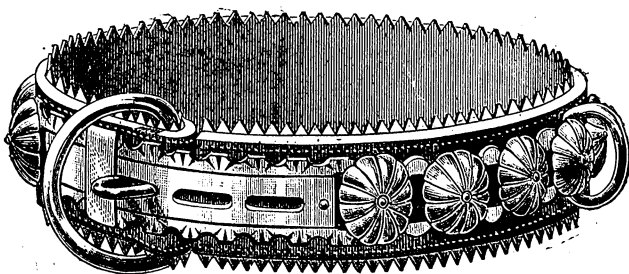
Union Brand



Side-Walk and Rink

ROLLER SKATES.

A Full Line of Dog Collars, Muzzles, Leads, Etc.



UNION HARDWARE CO., - TORRINGTON, CONN.

New York Office, TOWER & LYON, 95 Chambers St., New York.

# CLIMAX HEATER for OIL or GAS.

Four 4-Inch Burners. Cast Iron Reservoir.

Long Chimneys. Perfect Combustion.

Two Holes for Cooking.

One, Two, Three or Four Burners can

be used according to heat  
required.

CASTINGS ALL NICKELED.

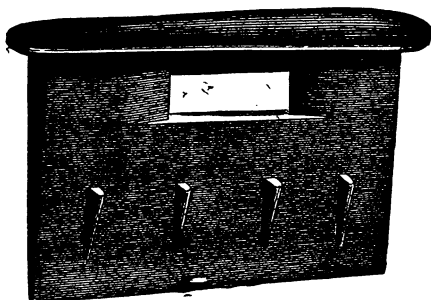
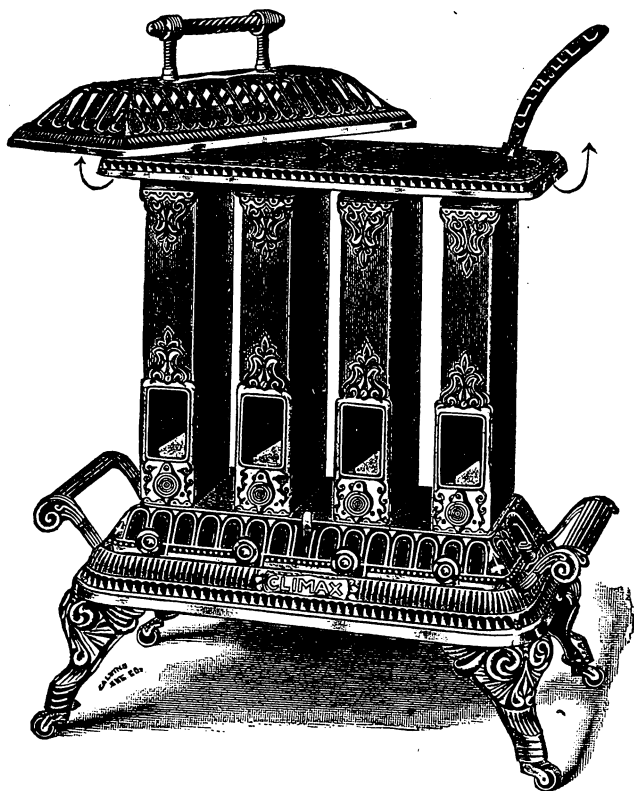
Capacity of Reservoir, 1 Gallon. Burns 10  
Hours.

Height, 25½ Inches. Weight, 40 Pounds.

SEND FOR CATALOGUE.

AGENCIES GIVEN.

CLIMAX MANUFACTURING, CO., 25 Lake St., Chicago.  
CLEVELAND FOUNDRY CO., BOSTON, MASS.



I still manufacture and sell the above  
axe wedge, which has more practical  
merit than any other thus far made.

**F. V. WOOSTER,**  
66 BEVERLY STREET, BOSTON.



## ELECTRIC TELEPHONE

Sold outright, no rent, no royalty. Adapted  
to City, Village or Country. Needed in every  
home, shop, store and office. Greatest conven-  
ience and best seller on earth.

Agents make from \$5 to \$50 per day.

One in a residence means a sale to all the  
neighbors. Fine instruments, no toys, works  
anywhere, any distance. Complete, ready for  
use when shipped. Can be put up by any one,  
never out of order, no repairing, lasts a life  
time. Warranted. A money maker. Write  
W. P. Harrison & Co., Clerk 10, Columbus, O.

## CYCLONE CORN SHELLER.

Will Shell a Bushel  
of Corn

in 4 Minutes.

**BEST  
SHELLER**  
in the world.

All Machines  
Warranted.



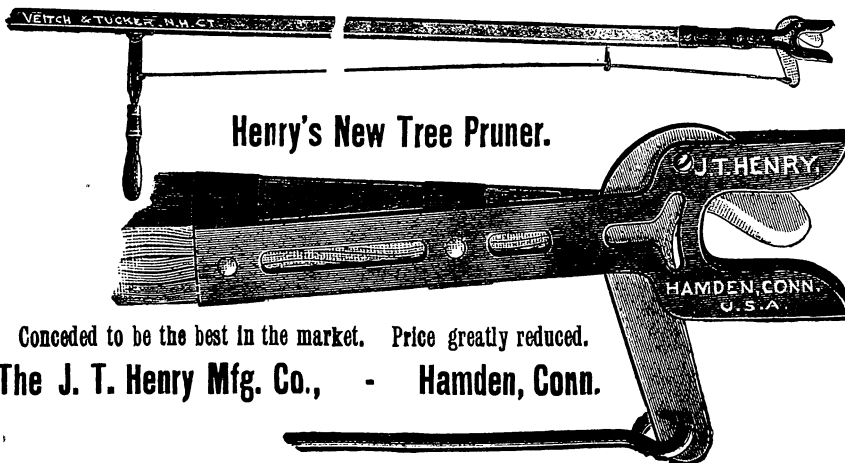
Sample Sheller  
**\$3.00.**

AGENTS  
WANTED.

Ask your  
Merchant  
for it

Send for  
circular.

GARRY IRON ROOFING CO., Sole Manufacturers  
and Owners, Cleveland O., U. S. A. Mention Iron Age.



Henry's New Tree Pruner.

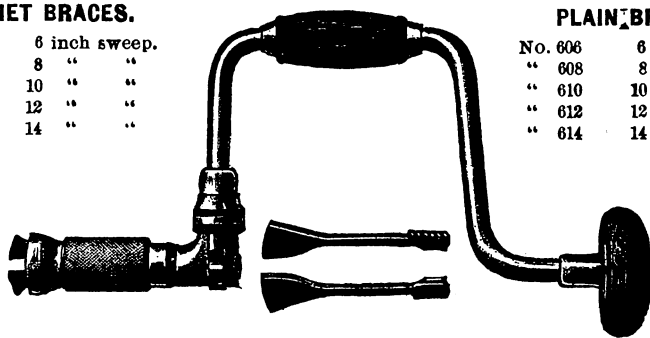
Conceded to be the best in the market. Price greatly reduced.  
The J. T. Henry Mfg. Co., - Hamden, Conn.

## RATCHET BRACES.

No. 66	6 inch sweep.
" 86	8 " "
" 106	10 " "
" 126	12 " "
" 146	14 " "

## PLAIN BRACES.

No. 606	6 inch sweep.
" 608	8 " "
" 610	10 " "
" 612	12 " "
" 614	14 " "

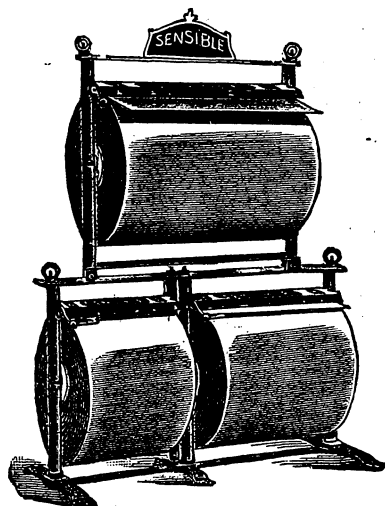


We make one grade only—THE BEST—in this style braces. Crank, Sleeve, Jaws, Ratchet and  
Pawls, all are steel. Ball Bearing Heads. Heads and Handles of Cocobolo Wood. Metal parts  
Nickel Plated. The hardened jaws open automatically as the sleeve is unscrewed until fully open,  
when a stop screw arrests the further motion of both sleeve and jaws.

**J. S. FRAY & CO., Bridgeport, Conn., U. S. A.**

# N. R. STREETER & CO.,

## Manufacturers of SAD IRONS and HARDWARE.



Our Original Line of  
**SENSIBLE and PIONEER**  
Roll Paper Holders and Cutters

**ARE THE BEST:**

**No. 1 Sensible**, Nickel Plated blade and name plate. Best finish.

**No. 2 Sensible**, Japanned blade without name plate.

**Pioneer**, made in one style only. Best finish.

**No. 1 Sensible and Pioneer**, same price. Are put up in any combination desired or in pyramids three high.

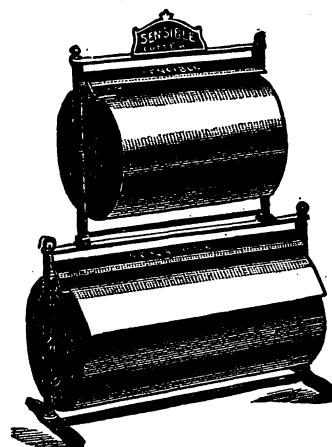
Our Giant Cutters and Toilet Paper and Wax Paper Fixtures enable us to offer a very comprehensive line of these goods.

Write for our 1894 Catalogue.

Factories, Rochester, N. Y., Pottstown, Pa.

General Office, Groton, N. Y.

N. Y. Office, W. H. JACOBUS, 90 Chambers St.



PATENT APPLIED FOR.  
The Steel Stretcher Handle,  
for Mrs. Potts' Sad Irons,  
in Hazel Wood only.  
**No. 110.**

**The Cleveland Wood Turning Co.,**  
710-726 Scranton Ave., Cleveland, O.

Special work in Handles and Wood Turning of all kinds. Our line of regular made Tool Handles is the best.

New York Office:  
**W. H. JACOBUS,**  
No. 90 Chambers St.



Walnut, Japanned, No. 1.  
Walnut, Tinned, No. 2.  
Hazel, Japanned, No. 10.  
Hazel, Tinned, No. 20.

### THIS IS THE "OLD RELIABLE" DOUBLE ACTION RATCHET SCREW DRIVER.

One of the very Best Tools Ever Invented.

It Combines Greater Strength, Convenience and Durability than was ever obtained in a Common Driver

Gives Perfect  
Satisfaction.  
Sells Readily.



LEADS THEM  
ALL.

Sold by all First-Class Dealers. Send for Price-List.

Manufactured by **GAY & PARSONS,** Augusta, Maine, U. S. A.  
JOHN H. GRAHAM & CO., Agents, 113 Chambers Street, New York.

## THE CLARK MFG. CO.,

Blind Hinges, Gate Hinges, Door Butts,  
And other **HARDWARE SPECIALTIES,**  
**BUFFALO, N. Y.**

## The English and American Mechanic:

AN EVERY-DAY HAND-BOOK FOR THE WORKSHOP AND THE FACTORY.

CONTAINING

Several Thousand Receipts, Rules and Tables Indispensable to the Mechanic, the Artisan and the Manufacturer.

By B. Frank Van Cleave.

A new, revised, enlarged and improved edition, edited by Emory Edwards, M.E.

ILLUSTRATED WITH EIGHTY-FIVE ENGRAVINGS.

In one volume, 500 pages, 12mo, closely printed, containing a vast body of information of value to all practical men. Elegantly bound in scarlet cloth, gilt. Price \$2.00.

Any Book Published Sent, Post-paid, on Receipt of the Price, by

**DAVID WILLIAMS, Publisher and Bookseller,**  
96-102 Reade Street, New York.

## JOS. F. McCOY CO.,

26 Warren St., New York,

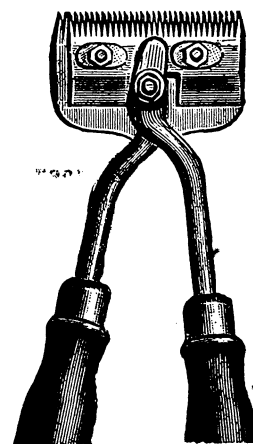
HEADQUARTERS FOR

*French Horse Clippers, "Bell"  
and "Comet" Brands.*

—ALSO—

*Clippers for Barbers' Use.*

SEND FOR LIST.



### CALF WEANER "Shaw's Pat."

MADE BY

Carroll Muzzle Co.

CARROLL, IA.

No wounds. No fretting.

Put Weaners on Calves and turn them out with the cows.  
"It is the only machine I ever had that worked perfectly in every way."  
A. R. ANDERSON, County Supervisor.





Write for Catalogue and Discounts.

# "NEVER-BREAK"

## SEAMLESS STEEL COOKING UTENSILS.

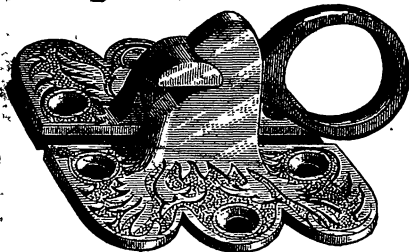
SPIDERS,  
GRIDDLES,  
KETTLES,  
STEW PANS,  
MASLINS, Etc.

Polished,  
Tinned and  
Porcelained.

THE BRONSON SUPPLY CO., New York and Cleveland.

### "CONROY" Refrigerator Door Fasteners

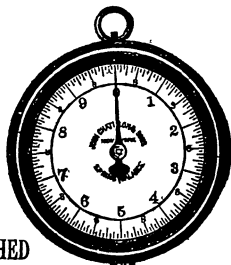
Have rapidly supplanted all others.  
Refrigerator Trimmings.



P. J. CONROY & CO., Paschall, PHILADELPHIA.

## John Chatillon & Sons,

85, 87, 89, 91, 93 CLIFF ST, NEW YORK

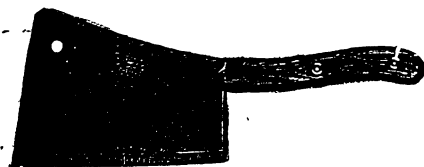


ESTABLISHED  
1835.

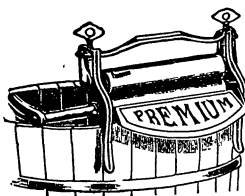
SEND FOR  
PRICE-LIST.



Sole Agents for  
Foster Bros.' Butchers' Cutlery.



John Chatillon & Sons, N. Y.



COLBY WRINGER CO., - Montpelier, Vt.

MANUFACTURERS OF THE

**Premium Wringer,**

With Automatic Apron Adjustment.

SURPLESS, DUNN & ALDER, Direct Representatives,  
15 Murray Street, New York.



No. 3

Globe Street Lamp.

Light your Streets and Driveways.

The S. G. & L. CO.

## Tubular Globe Street Lamp

IS THE Best Street Lamp Manufactured.  
Equal to the best Gas Light.  
Will not Blow Out in the Strongest Wind.  
Will not Smoke.  
Will not Freeze.  
Automatic Extinguisher.  
Outside Wick Regulator.  
Will Burn Four Hours for One Cent.

MANUFACTURED BY

**STEAM GAUGE AND LANTERN CO.,**

SYRACUSE, N. Y.

Western Branch, 25 Lake St., Chicago, Ill.



## The Rochester Globe Tubular - - Station and Street Lamp.

It's a long name, but it tells a good deal. It tells you of a new Street Lamp with "The Rochester" Central Draft Burner. A central draft burner (round flame) gives three times the light of an old style flat-wick burner. The first and only Tubular Globe Central Draft Lamp ever made! Storms, rain, snow, sleet or hail do not affect it. Burns all night. Made with either bail or post socket, with 26 inch enamel reflector if wanted, for railroad and other uses. Takes regular No. 3 or 9 street lamp globe, to be had everywhere. For Railroad Stations, Ware-rooms, Mills, Docks, &c., it is the best lamp ever made. Price, \$6.00; send for trade discount.

MANUFACTURED ONLY BY

**THE ROCHESTER LAMP CO.,**

42 PARK PLACE, }  
37 BARCLAY ST., } NEW YORK.

## This is the "SALEM" HANGER.

And when it is on the window casing, a TEN-ANT can put up ANY SHADE FIXTURE that is made without using a screw. THE MAN INTERESTED is the owner of the house. THE MAN to sell the "Salem" to the owner IS THE HARDWAREMAN.

Write us for Price-List.

The W. A. South Co., Salem, Mass



# THE BOLGIANO MANUFACTURING CO.,

## BALTIMORE, MD.,

MANUFACTURERS OF { Water Motors, Self-heating Sad Irons and Soldering Irons, Combination  
Electric Fan Water Motors, Ventilating Fans and Ventilated Bread Boxes.

Send for Illustrated Catalogue with Wholesale Price List.

### NEW WATER MOTOR, \$5

BOLGIANO'S LITTLE GIANT, No. 1,  
Will run your Sewing Machine, Fans and other Light Machinery.

A Week's Work  
Done in a Day.  
No Plumbing  
Required.

LIVES ON WATER.

DOES THE WORK OF A MAN.  
WONDERFUL LABOR SAVER.

No. 2, \$10. Fans, Ice Cream Freezers,  
Lathes, Scroll Saws, Church Organs,  
etc.



\$2.

BOLGIANO'S

Wonderful New Air Burning Iron.

Saves Tons of Coal.

Burns Air.

Without Smell or Dirt.

Keeps the Room Cool.



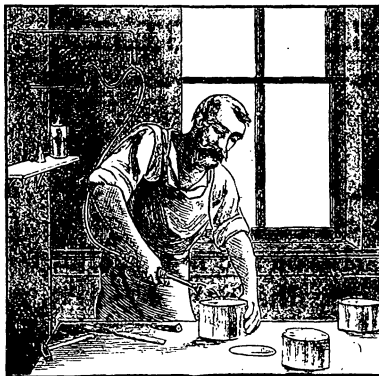
NO. 3 MOTOR, \$15. For Fans, Printing Presses,  
Washing Machines, Grindstones, Coffee Mills,

All Sizes of Light Fans for sale. Send for Circulars.

### \$2. Bolgiano's New Air Burning Soldering Iron.

Saves Tons of Coal.

Burns air. Without smell or dirt



(Patent applied for.)

### "NOT TOO NEW, BUT JUST NEW ENOUGH!"

TESTED BY SEVERAL YEARS OF POPULARITY WITH THE TRADE.

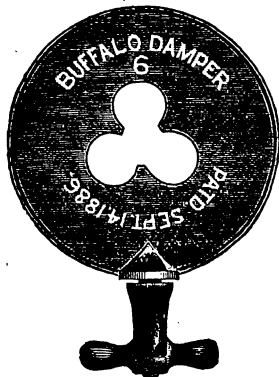
SAVES

TIME AND TEMPER.

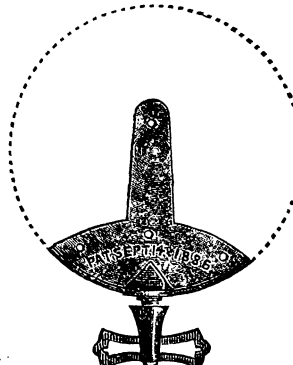
SIMPLE,  
SINGLE BEARING,  
EASILY PUT IN.

ONLY ONE HOLE IN PIPE.

NO SPRINGS.



THE BUFFALO DAMPER.



THE BUFFALO DAMPER CLIP.

### The Buffalo Damper Clip Is a Success!

As is testified to by thousands of dealers who couldn't "keep house" without it. Any ODD size damper easily made.

ALL DAMPERS or DAMPER CLIPS supplied with enameled wood, or metal handles, as desired.

—SOLE MANUFACTURERS—

SIDNEY SHEPARD & CO., C. SIDNEY SHEPARD & CO.,  
BUFFALO, N. Y. CHICAGO, ILL.

CHAS. W. WELLS, New England Sales Agent, 19 Pearl St., BOSTON, MASS.

SAMPLE ORDERS SOLICITED.

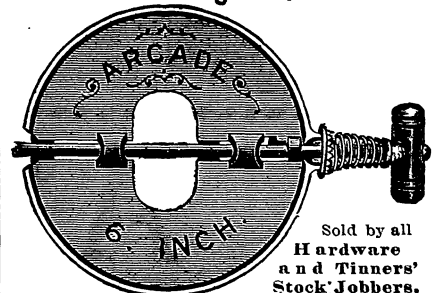


### ALUMINUM

Ingots, Sheets, Rods, Tubes, Wire and Castings, Cooking  
Utensils and Table Ware, Tea and  
Coffee Pots, Chafing Dishes, Rice Boilers, Tea Kettles, &c.

WRITE FOR THE WOHLER ALUMINUM COMPANY,  
CATALOGUE. 55 Jackson Street, - Chicago, Ill.

Made by Arcade Mfg. Co., Freeport, Ill.



Sold by all  
Hardware  
and Tinners'  
Stock Jobbers.

### ELEMENTS OF COST.

By Frederick W. Child.

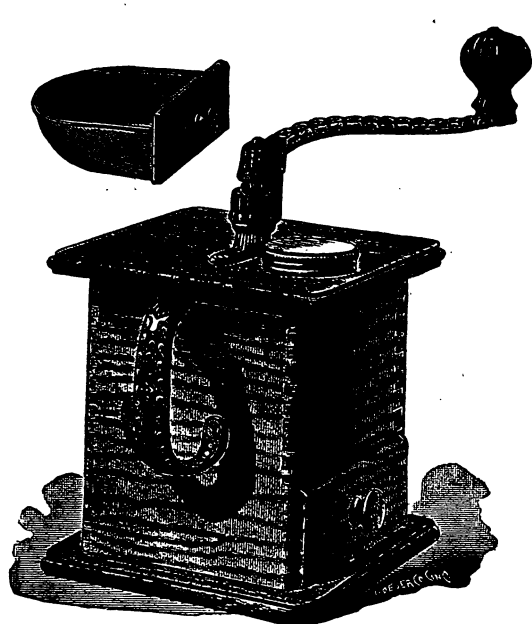
20 PAGES, 5 x 7 1/4 Inches  
Paper, 25 cents.

An address to the Institute of Accounts, New York, of which the writer is a member, put in form to assist those in charge of manufacturing accounts. Practical forms are included for a series of order books, examples of foreman's order, form of pay-roll, quarter-time book, job time book, form of summary, charges book, summary of costs, material, labor, cash, expense, manufacturing and improvement acts, store-room, iron foundry, brass foundry.

sent, Postpaid, on receipt of price, by

DAVID WILLIAMS, Bookseller & Publisher,

96-109 Beade Street, New York.



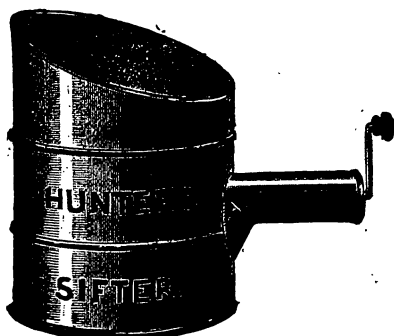
# Don't Forget Us

when you are in the market for Coffee Mills, Money Drawers, Rat Traps, Combined Showcases and Alarm Tills. We are the originators of this line of goods and our prices are all right.

Waddel Wooden Ware Works,

—GREENFIELD, OHIO.—

## More About Sifters.



If you are not handling the best (there's only one best made, that's the Hunter), we want to make you a proposition that will be satisfactory to you and profitable to both. Will you send us your address and let us submit the proposition? If so, do it at once, please; it's best.

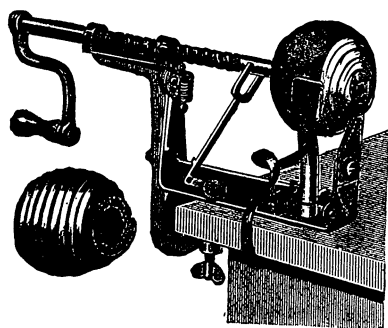
**The FRED. J. MEYERS MFG. CO.,**

HAMILTON, O.

F. J. MATTISON, Eastern Agent,  
69 Beekman St., NEW YORK.

IF  
YOU  
WANT

# APPLE PARERS



We have all kinds, from seventy-five cents to twenty dollars each.

Our machines received highest award at the World's Fair. We are the oldest and largest manufacturers of Apple Parers in the world, and we make a larger variety than all others combined. If you are in need of Apple Parers write us. Our machines are sold by the jobbing trade everywhere.

**GOODELL COMPANY,**

**ANTRIM, N. H.**

The Iron Age Standard Hardware Lists For Use in Price Books. Compiled by R. R. WILLIAMS, Hardware Editor of *The Iron Age*. These lists are supplied in pamphlet form and are intended to be cut out and inserted in *The Iron Age* Hardware Price Books. For this purpose they are printed on thin and tough paper of the best quality, and prepared with a special view to compactness and convenience of reference. Some of the lists are printed in more than one arrangement, permitting a choice of the best adapted.

For Sale by David Williams 99-102 Rensselaer St., N. Y.

### DIRECTIONS FOR USING WILLIAMSON'S NEW POWER CORK SCREWS.

**KEEP ON TURNING, DO NOT PULL.**

No. 1243, Nickel Plated, Apple Wood Handle, \$5.00 per dozen.  
" 1443, " " Rosewood 5.50

For Discounts and Prices of other styles send for Catalogue.

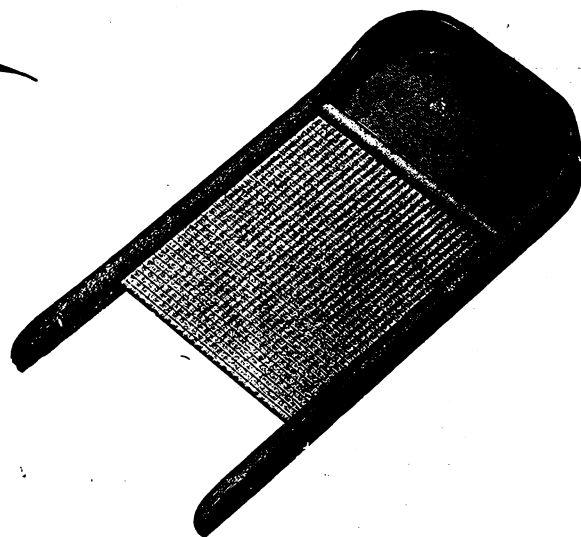
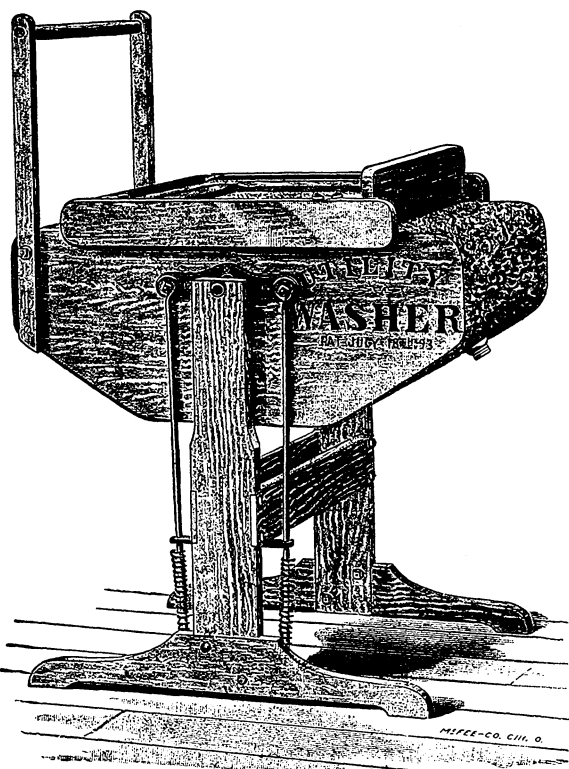
**C. T. WILLIAMSON WIRE NOVELTY CO., NEWARK, N. J.**

Manufacturers of Wire Specialties for the Trade





# Utility



## Washer and Board

Your customers can get along without both, but neither separately. The washer has the peculiarity of washing the clothes clean and not wear out either it or the operator. While the board is something entirely new yet thoroughly tested and proven the best made. Write for prices, please.

**Olds Wagon Works,**  
Fort Wayne, Ind., U. S. A.

**JOS. LAY & CO.**

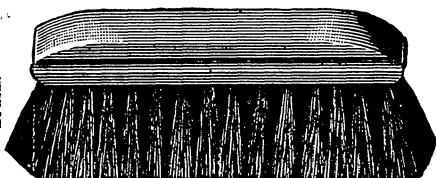
**RIDGEVILLE,  
INDIANA,**

—MANUFACTURERS OF—



No. 10 Hard Molders' Brush.

No. 3 Soft Molders' Brush.



Hard and Soft Molders' Brushes, Steel Wire Casting Brushes, Stable, Shop, Street, Boat and Carpet Brushes, Brooms and Brushes of all kinds.

**HIGH GRADE.**

**LOW PRICED.**

## A GOOD PROFIT TO DEALERS

### A BALL BEARING WRINGER. THE CLEVELAND.

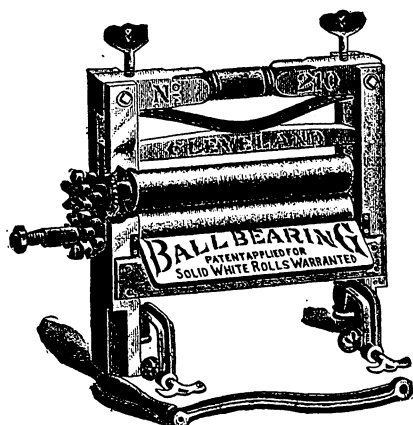
Runs like a bicycle. Very easy to operate, no other like it. Can be sold at higher prices and better profit than others, hence it pays to push it. It has been on the market over a year and is giving perfect satisfaction.

Send for Sample or Write for Catalogue and Prices.

ALL OTHER KINDS OF WRINGERS.

**THE PEERLESS MANUFACTURING CO.,**  
CLEVELAND, OHIO.

**We also make High Grade Bicycles.**



**OSGOOD & HOWELL, Pacific Coast Agents.**

**132 Market St., San Francisco, Cal.**

A practical means of rapidly reaching absolutely accurate results without the mental wear of computing.

It gives at a glance the net of any sum at a great range of discounts, simple and complex, and it is accurate, rapid and practical. Price, \$3.00 ; Double Indexed Edition, \$4.00.

Mailed, postpaid, upon receipt of price by **DAVID WILLIAMS,** 96-102 Reade Street, New York.

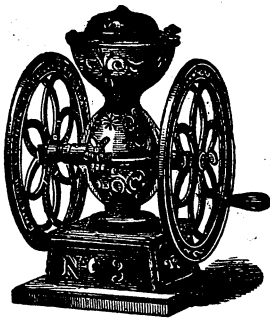
**LADD'S DISCOUNT BOOK.**

# THE ENTERPRISE M'F'G CO. OF PA.

THIRD AND DAUPHIN STREETS, PHILADELPHIA.

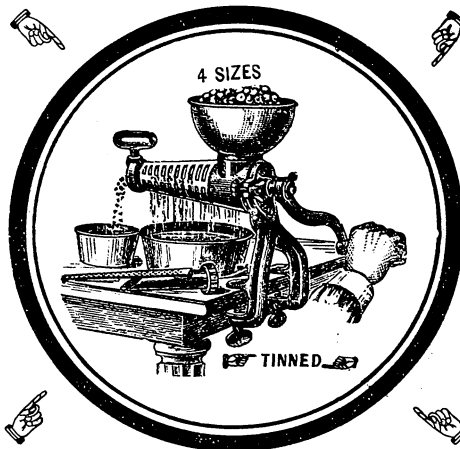
## COFFEE MILLS.

28 Sizes.



\$1.25 to \$100.00.

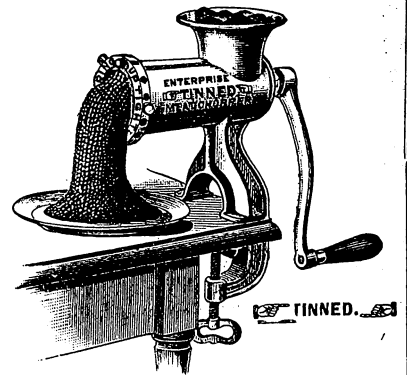
## FRUIT PRESS.



No. 24, Price, \$3.00

## MEAT CHOPPERS.

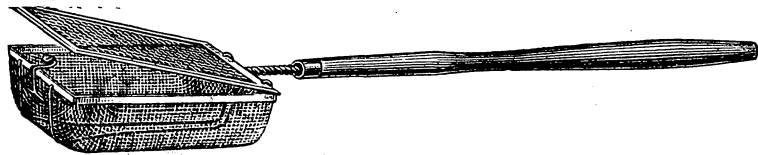
16 Sizes.



\$2.00 to \$275.00.

FOR SALE BY THE HARDWARE TRADE. SEND FOR OUR LATEST CATALOGUE.

# Low Prices and High Quality.



Our styles of Corn Poppers are guaranteed to be all of the latest and best.

Dealers everywhere are entitled to New Catalogue and New Prices.

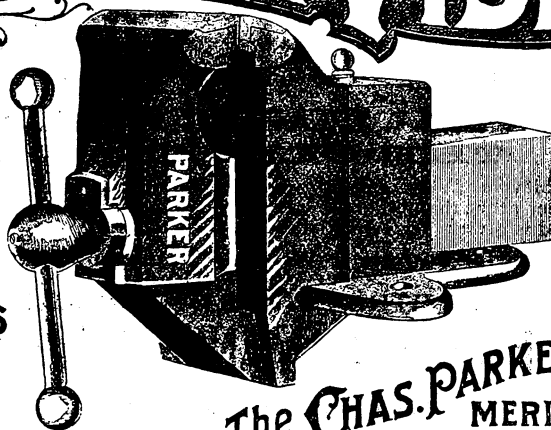
Write to know what our quantity discounts are.

**BROMWELL BRUSH & WIRE GOODS CO.,**  
ESTABLISHED 76 YEARS.

Cincinnati, Ohio.

# PARKER VISE

HAS STOOD  
THE TEST  
OF OVER  
FIFTY YEARS

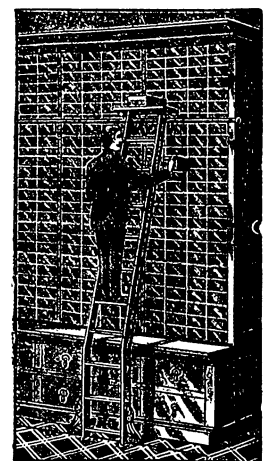


The CHAS. PARKER CO.  
MERIDEN,  
CONN.

This is a fac-simile of an 11x15 inch show card in gold and colors which is attractive in every hardware store. We will mail one to any hardware dealer who will place it conspicuously in his store.

## THE Bicycle Step Ladder.

Especially adapted for  
Hardware Stores.



THE ---

NEWEST,  
NEATEST,  
SIMPLEST,  
EASIEST OPERATED,  
and SAFEST



----- STORE LADDER MADE.

Highest Award World's Fair.

WRITE US.

The Bicycle Step Ladder Co.,

N. Y. AGENCY:  
E. J. HUSSEY & CO.,  
80 John St.

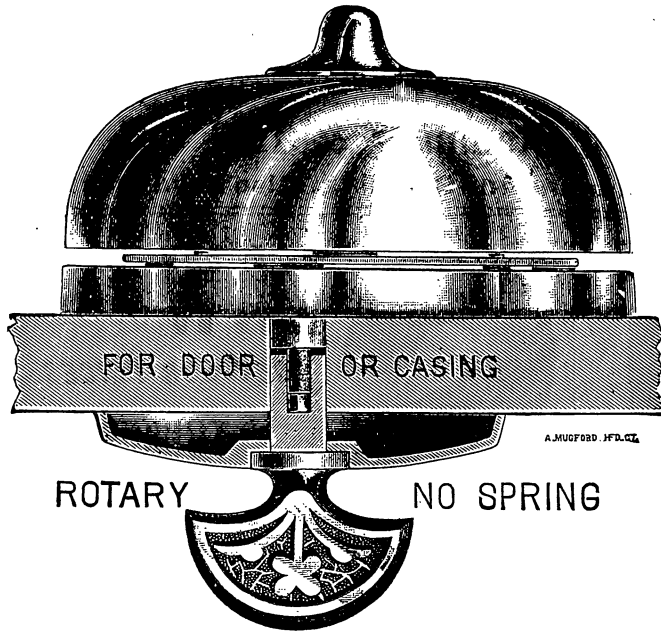
50 State St.,  
Chicago, Ill.

# NEW DEPARTURE "ROTARY" DOOR BELLS

## ELECTRICAL RESULTS.

3 Inch.

No. 91, Nickel Plated.  
No. 92, Bronze Plated.  
Per Doz., \$17.50.



3 1/2 Inch.

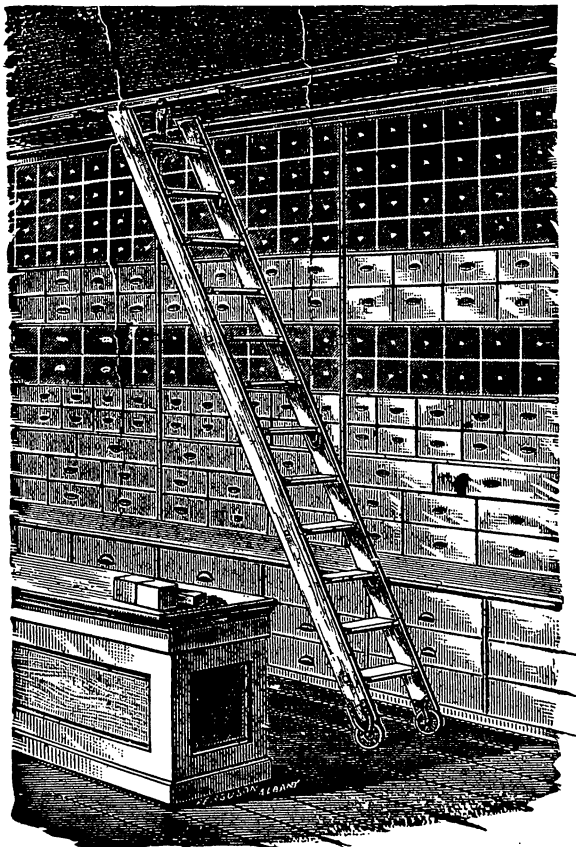
No. 101, Nickel Plated.  
No. 102, Bronze Plated.  
Per Doz., \$20.00.

Simply turning the knob about one-fourth in either direction produces about ten clear, full tones, which though not startling or annoying, can be better heard all through the house than any bell ever made to imitate Electrical Results.

SOLE AGENTS,

**JOHN H. GRAHAM & CO,** { 113 Chambers St.,  
N. Y. CITY, N. Y.  
**WRITE FOR PRICES.**

## THE "NOISELESS" STORE LADDER.



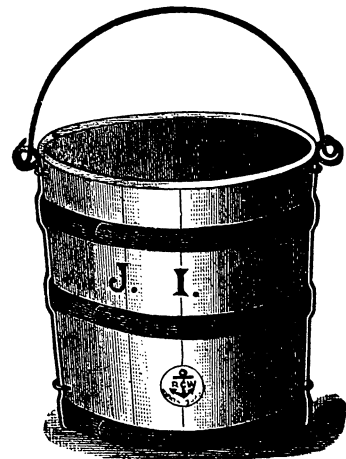
The latest and best. Perfectly noiseless. Neat in appearance.

Manufactured by

**M. CROISSANT,**

**ALBANY, N. Y.**

## "J. I. C." HORSE PAIL.



Patented August 26, 1886.

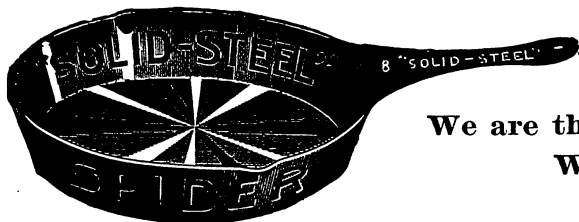
Made of Best Seasoned White Oak or Virginia White Cedar.

**SEE THAT STRAP?**

Hoops cannot come off. Best stable, mortar and building pail ever made.

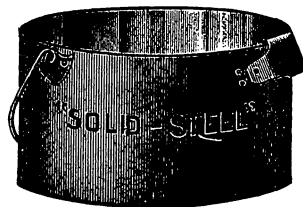
Prices quoted on application.

**RICHMOND CEDAR WORKS,**  
Manufacturers of Woodenware,  
**RICHMOND, VA.**

**"SOLID-STEEL" SEAMLESS HOLLOW WARE.**

No Seams, no Rivets in "Solid-Steel" Ware.

We are the leaders in Steel Hollow  
Ware and all Sheet  
Metal Work.

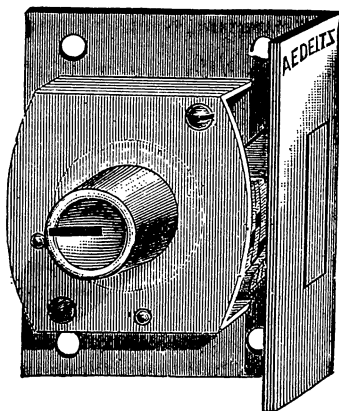


"Solid-Steel" Maslin Kettle.

**The Cleveland Stamping & Tool Co., Cleveland, O.**

**We do Light and Heavy Stamping and Blanking. Also build Dies and Stamping Machinery.**

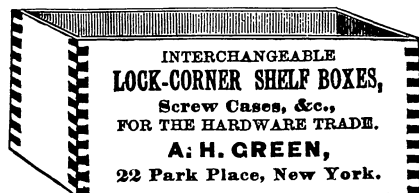
**A. E. DEITZ**



No. 51 Lock.

**J. C. McCARTY & CO., Agents,**  
97 Chambers and 81 Reade Sts., New York.

Factory, **BROOKLYN, E. D., N. Y.**



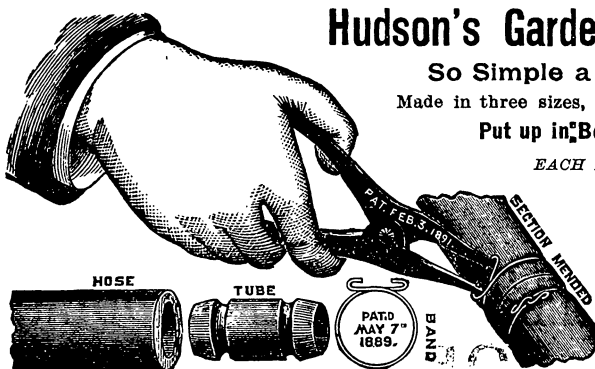
# S LAW AND KRAUT

GET OUR PRICES.

## TUCKER & DORSEY MFG. CO.,

Indianapolis, Ind.

# CUTTERS.



### Hudson's Garden Hose Mender.

So Simple a Child Can Use It.

Made in three sizes, for  $\frac{1}{2}$  in.,  $\frac{3}{4}$  in. and 1 in. hose.

Put up in Boxes for Family use.

EACH BOX CONTAINS:

- 1 Pair Pliers,
- 20 Bands,
- 6 Tubes.

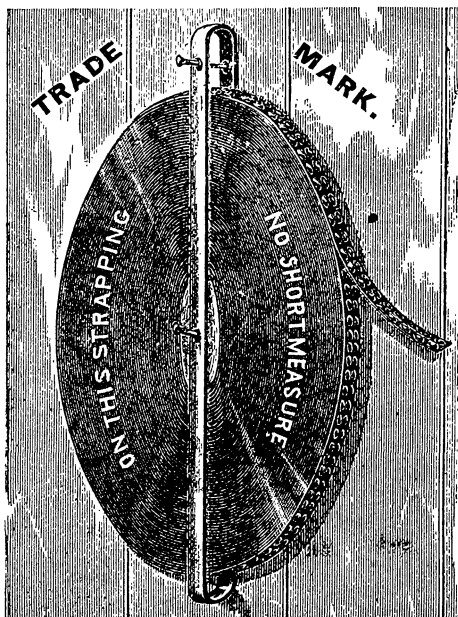
Sells readily at 75 cents.  
Liberal discount to Dealers.

Send for Full Description.

**C. E. HUDSON & CO., Manufacturers, Leominster, Mass.**

# Injunction Order.

PATENTED IN ALL COUNTRIES.



SHOWING REEL HUNG UP READY FOR USE.

SIX PATENTS,

Dated May 14th, 1889, Nov. 25th, 1890.

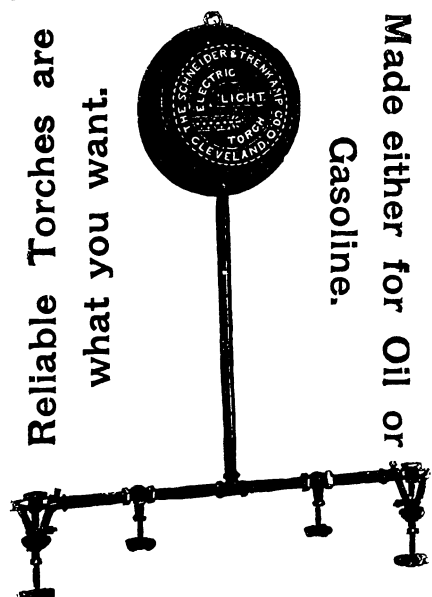
See

*The Iron Age,*

*Issue of June 21st,*

*Page 1210.*

All box straps put up in this style to be genuine must bear the name of the **CARY MFG. CO., NEW YORK**, on each reel.



Reliable Torches are  
what you want.

Made either for Oil or  
Gasoline.

These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner.

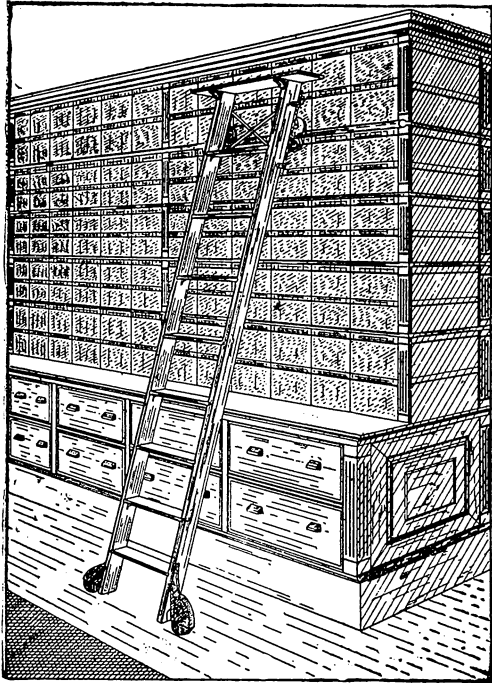
Write us for prices. A liberal discount given to the trade. Manufactured by  
**THE SCHNEIDER & TRENKAMP CO.**  
Nos. 479 to 497 Case Ave., Cleveland, Ohio.

# THE VICTOR DOUBLE TROLLEY STORE LADDER.

**WORKS** ON A NEW PRINCIPLE. **EASILY.** **NOISELESSLY.** **HANDY** ILIY ADJUSTED TO USE. **COSTS** SO LITTLE THAT EVERY ESTABLISHM'NT CAN AFFORD TO HAVE IT

All orders are sold subject to thirty days' trial and if not satisfactory may be returned at our expense.

SEND FOR CIRCULAR.



## DON'T

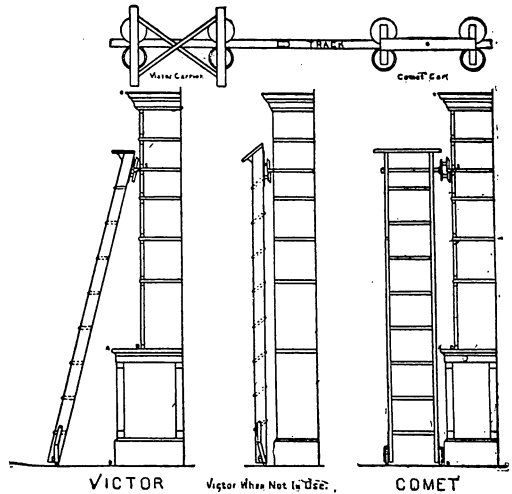
Risk your neck on a barrel.

## DON'T

Try to jump with mouth full of screws and hands full of something else.

## DON'T

Fail to send for price of Victor Ladders.



**COBURN TROLLEY TRACK MFG. CO., HOLYOKE, MASS. ALSO PARLOR, BARN AND FIRE-DOOR HANGERS**

## UNTIL JAN. 1st NEXT.

A \$40.00 BOOK FOR \$2.50 Per Volume. One of the Greatest Publications of the Age.

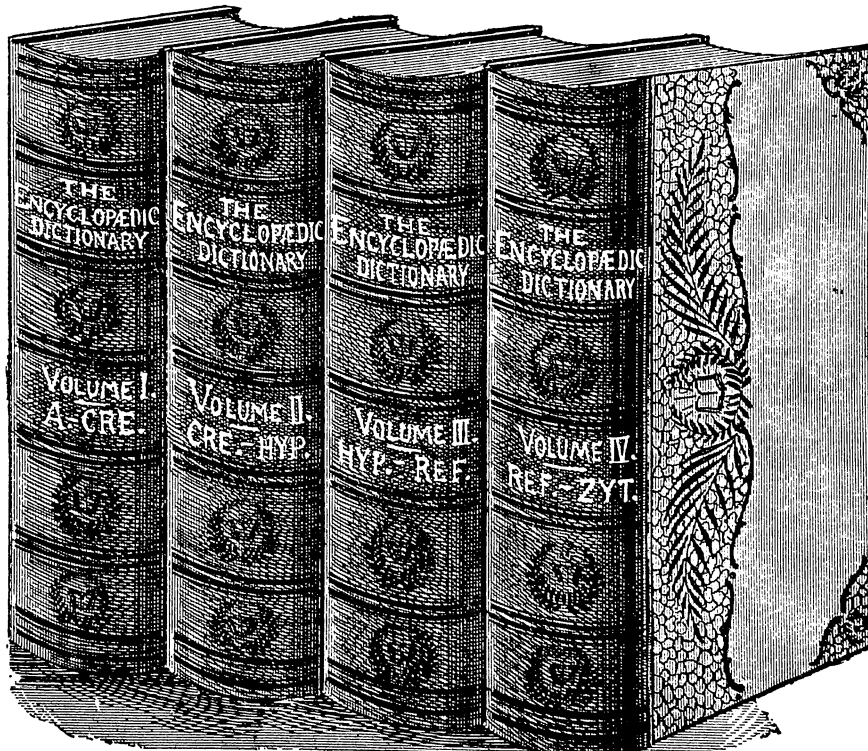
Recognized and Indorsed by Prominent Men and Colleges Everywhere as the Best Educational and General Reference Work.

## THE ENCYCLOPÆDIC DICTIONARY. (Americanized.)

Edited by Professor ROBERT HUNTER, A. M., F. G. S. Americanized by Professor CHARLES MORRIS.

### THE BEST DICTIONARY,

Because it is the only one in existence that contains every word in the English language from the Tenth Century to the present day. It has 250,000 words, or more than any other dictionary ever published, each word being exhaustively treated as to its origin, history, development, etymology pronunciation, and various shades of meaning.



Authentic, Reliable and Handy. Printed and bound in the best style. Has no competitor in point of cheapness and general worth.

Complete in four large volumes, each 9 x 12 inches.

Sent by express to any part of the United States or Canada, all charges to be paid by the person receiving the books. Price will be advanced Jan. 1st next. Order while the opportunity lasts.

Volume 1 is now ready for delivery, and volumes 2, 3 and 4 will appear and be sent at monthly intervals.

The above illustration is an exact reproduction of the Four Magnificent Volumes of THE ENCYCLOPÆDIC DICTIONARY, richly bound in Silk Cloth with Gold Back Stamp, Handsomely Embossed Sides and Marbled Edges.

**DAVID WILLIAMS, Publisher and Bookseller,**

**96-102 Reade St., N. Y.**

TEMPORA MUTANTUR ET NOS MUTAMUR IN ILLIS.

# WROUGHT STEEL DOOR LOCKS.

Wrought Steel Cases.

Wrought Steel Fronts.

Wrought Steel Bolts.

They  
Excel in  
Finish,



Lightness  
and  
Strength.

No. 7726, Bronze Plated, Wrought Steel Front.

Wrought Steel Springs.

Wrought Steel Tumblers.

Wrought Steel Keys.

## RUSSELL & ERWIN MANUFACTURING CO.,

Sole Manufacturers.

NEW BRITAIN, CONN.

NEW YORK.

PHILADELPHIA.

BALTIMORE.

LONDON.



# READING HARDWARE CO.

NEW

ARTISTIC  
DESIGNS

—IN—

Solid Bronze

—AND—

WROUGHT BRONZE

—FOR—

Private Residences

AND

Public Buildings.

“Vassar”

LOCKS AND LATCHES

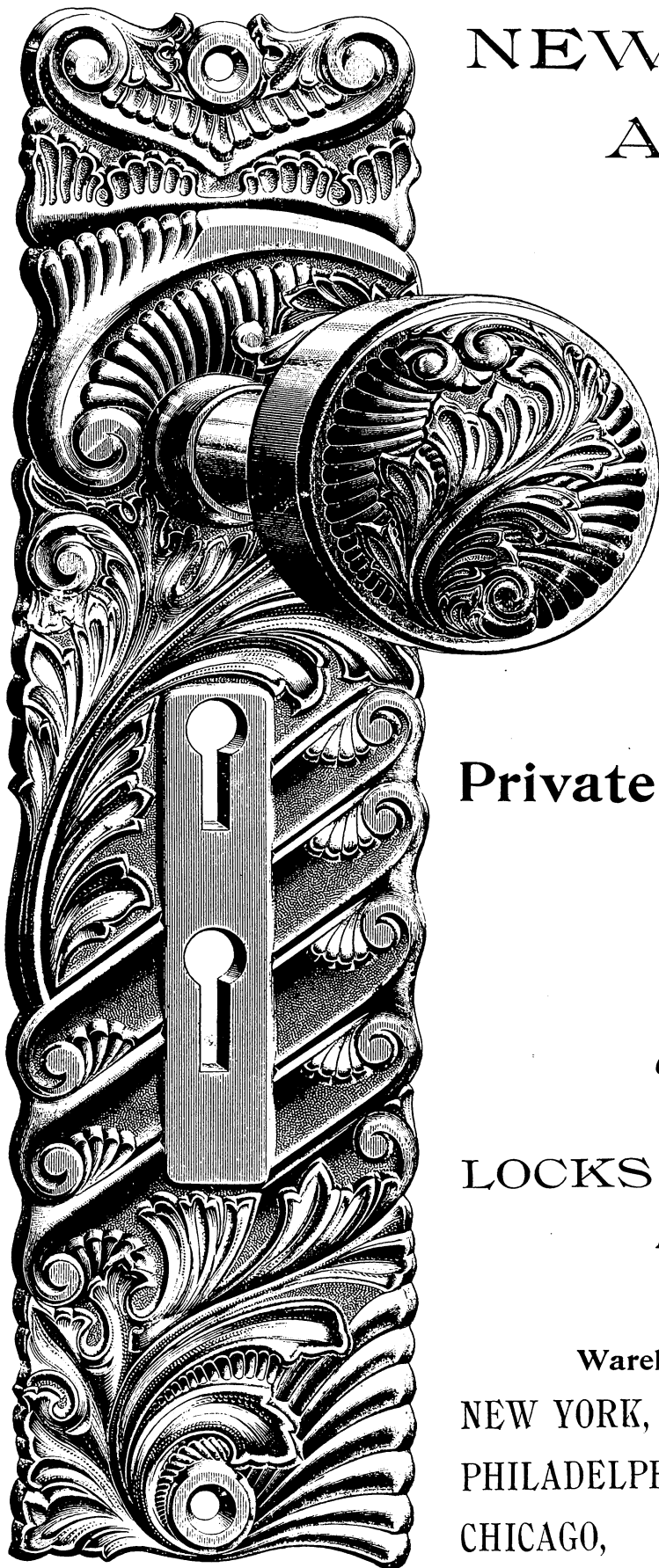
Are Safest and Best.

Warehouses and Sample Rooms:

NEW YORK, - - 96 & 98 Reade Street.

PHILADELPHIA, - 514 Commerce Street.

CHICAGO, - - - 73 Wabash Avenue.



WROUGHT BRONZE

KNOB AND ESCUTCHEON.

No. 01090 $\frac{1}{4}$  x 01067 $\frac{1}{4}$ .

Factories and Main Office: = READING, PA.

K

# IMPROVED EDITION OF THE IRON AGE HARDWARE PRICE BOOKS.

Arranged by R. R. WILLIAMS, Hardware Editor of the Iron Age.

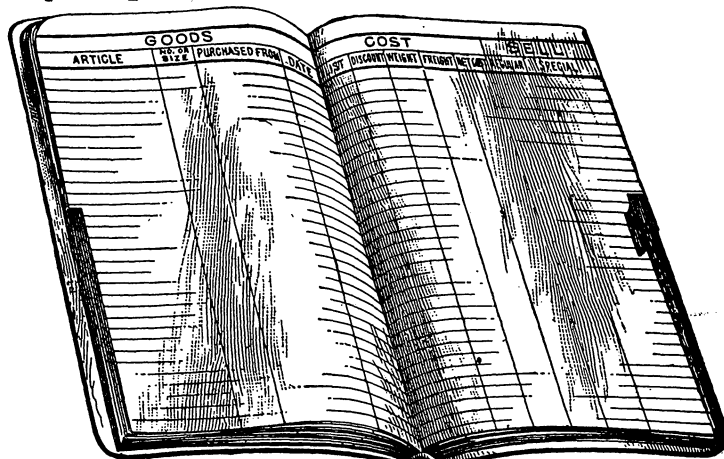
These Books are printed on paper of superior quality and bound in grain seal leather.

Columns are provided for the name and number or size, for noting from whom purchased, date of quotation or purchase, list and discount, and for entering freight expenses as an element of cost. Under the heading of selling prices, the regular and any special price, or remarks in regard to the goods are given place. This book goes into considerable detail in describing the goods and cost prices. It has been arranged in accordance with the views of many Hardwaremen whose methods are careful and exact.

Size, 4 x 7 in.; grain seal leather.

## FOUR EDITIONS:

A, 200 pages,	-	-	-	-	\$1.00
A F, 200 pages with flap,	-	-	-	-	1.25
A 2, 400 pages,	-	-	-	-	1.50
A F 2, 400 pages with flap,	-	-	-	-	1.75



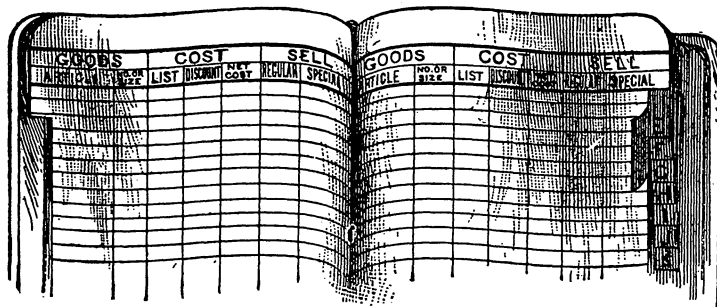
Hardware Price Book A.

In this book each page is complete, and the record of prices does not, as in Book A, run across two pages. Thus it accommodates a larger range of goods with much less detail in the record. It is adapted for office or store use, and by the use of familiar abbreviations, sufficiently large for the convenient and concise record of prices.

Size, 4 x 7 in.; grain seal leather.

## FOUR EDITIONS:

B, 200 pages	-	-	-	-	\$1.00
B F, 200 pages with flap,	-	-	-	-	1.25
B 2, 400 pages,	-	-	-	-	1.50
B F 2, 400 pages with flap,	-	-	-	-	1.75



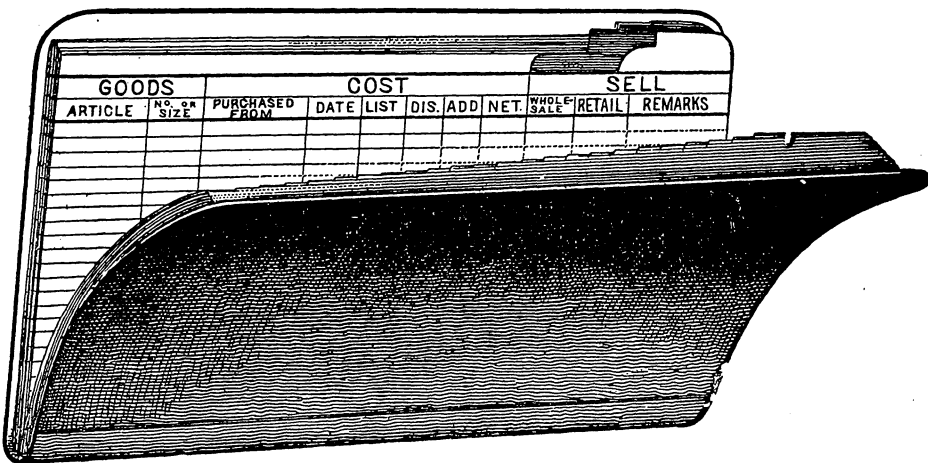
Hardware Price Book B.

The headings in Book C run across the top, in a line parallel with the hinge. In this way a very complete record can be kept on a single page. The details of weight and freight contained in Book A are omitted, and a single column headed "Add" given for the insertion of freight or other expenses which it is desirable to include in the cost. Under the selling prices space is left for the wholesale price, the retail price, and also for any remarks in regard to cost of the goods, desirability of pushing them, or other matters.

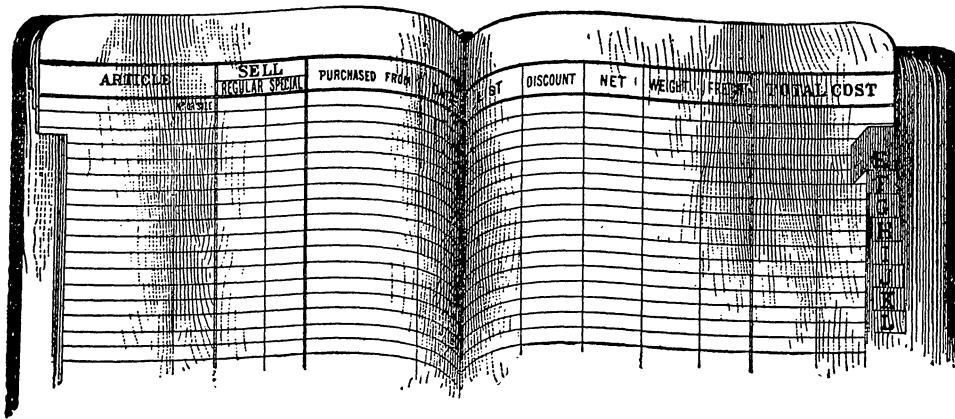
Size, 4½ x 7½ in.; grain seal leather.

## FOUR EDITIONS.

C, 200 pages,	-	-	\$1.00
C F, 200 pages with flap,	-	-	1.25
C 2, 400 pages,	-	-	1.50
C F 2, 400 pages with flap,	-	-	1.75



Hardware Price Book C.



Hardware Price Book D.

arrangement is adapted to the requirements of the trade in this direction.

FOUR EDITIONS.	D, 200 pages,	-	-	-	\$2.00
	D F, 200 pages, with flap,	-	-	-	2.50

Size 5¼ x 8 in.; grain seal leather.

	D 2, 400 pages,	-	-	-	\$3.00
	D F 2, 400 pages, with flap,	-	-	-	3.50

Price Book D will recommend itself particularly for desk and store use, and for salesmen on the road.

The name of the article, its number or size and the selling price are the first to meet the eye on the left-hand page, as embodying information desired when the selling price is required. The other headings follow in convenient order, by which a detailed memorandum regarding the goods may be kept, the whole being seen at a glance. A number of pages at the back of the book are arranged for memoranda, which will be found a great convenience. This ar-

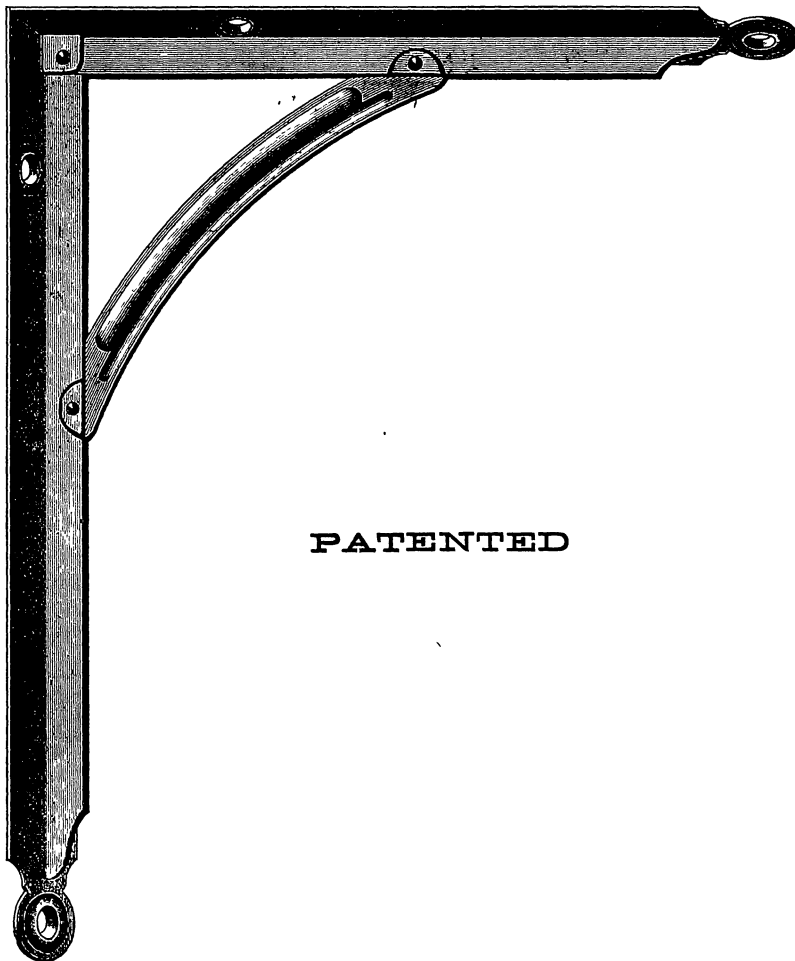
Sent, post-paid, on receipt of price by **DAVID WILLIAMS, Publisher, 96-102 Reade St., New York**

# A Perfect Shelf Bracket

—: MADE OF:—

**WROUGHT STEEL.**

**LIGHT! = STRONG! = ELEGANT!**



**PATENTED**

As a result of long and careful study and much experimenting we are able to offer the trade a

## STEEL SHELF BRACKET

which is far superior to anything of the kind heretofore produced, and which we believe to be a

**PERFECT ARTICLE!**

We base our faith in these assertions on the following points of

### **SUPERIORITY:**

- 1.—The use of the **arched** or **angle** forms of steel in the wall and shelf plates, which gives **much more strength** with less metal than if made flat.
- 2.—The **Corrugation** of the brace, which renders it secure against buckling or bending sideways under the severest strain.

The application of these principles makes a **Light, but Very Strong Bracket.**

**PRICES ON APPLICATION.**

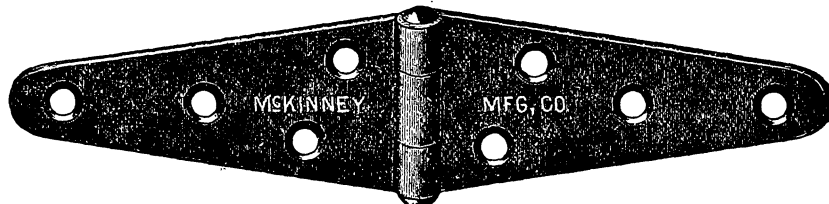
**THE STANLEY WORKS,** New Britain, Conn.  
79 Chambers St., N. Y.

# STEEL HINGES AND BUTTS.

STANDARD GOODS.

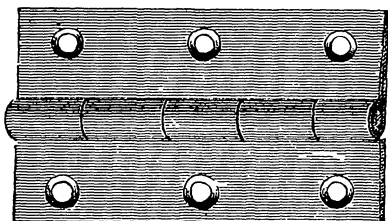
McKINNEY MFG. CO., - ALLEGHENY, PENN.

SEND FOR  
LIST.



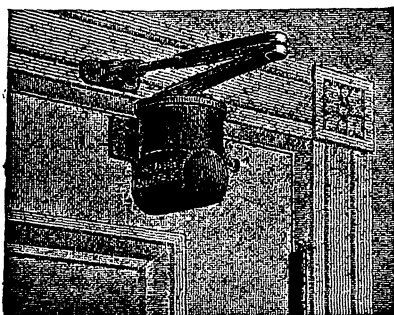
ORDERS FILLED  
ON SIGHT.

**"NONE BETTER."**



## Cast-Brass Butt Hinges

IN STOCK AND FOR SALE BY  
**W. & J. TIEBOUT,**  
Nos. 16 & 18 Chambers Street, New York.  
MANUFACTURERS OF  
BRASS, GALVANIZED & SHIP CHANDLERY  
HARDWARE.



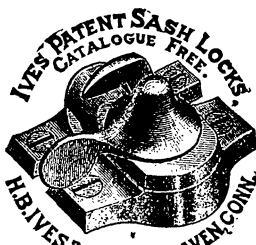
## Bardsley's Liquid Door Check and Spring.

Perfect in action, durable, neat in appearance, low in price and fully warranted. Responsible Agents wanted in the principal cities.

J. BARDSLEY, 149 & 151 Baxter St., New York

HIGHEST AWARD.

ALWAYS PLEASE.



ALWAYS SELL.

NO OTHER SASH LOCK IS SO WELL UNDERSTOOD OR APPRECIATED BY ARCHITECTS

## The New Britain Hardware Mfg. Co.

New Britain, Conn., U. S. A.

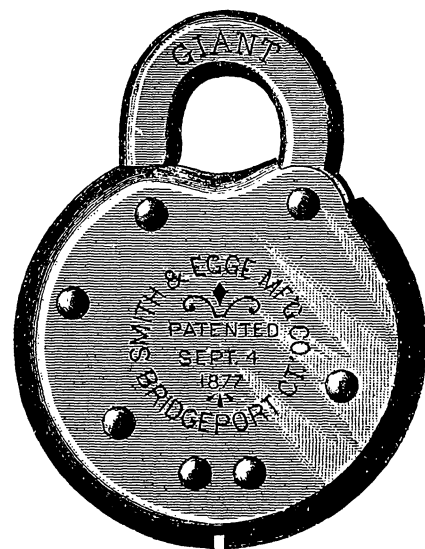
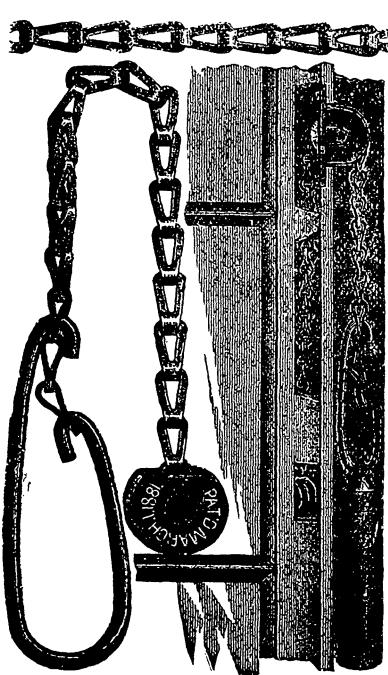
MAKERS OF ALL KINDS OF

Special Machine Screws, Studs, Belts, &c.  
**BICYCLE PARTS,  
SPECIAL HARDWARE.**

Pattern Makers' Dowels and Emery Wheel Dressers  
Electro, Brass and Nickel Plating.

## THE SMITH & EGGE MFG. CO.,

BRIDGEPORT, CONN.



## THE GIANT PADLOCK.

Centennial Award. "Superior in Every Respect."

This is one of the best selling locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited.

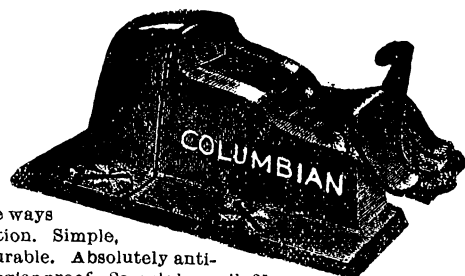
## THE GIANT METAL SASH CHAIN

is a substitute for cord in hanging weights to windows. It is manufactured by us only, and by automatic machinery, patented and owned exclusively by ourselves, and whereby we secure uniformity of construction and quality. We have been to great expense in producing a metal having all the qualities and conditions requisite for making suitable chain for this purpose, and to prevent other chain of the same pattern of link and of the same general appearance, but made from an inferior metal, being offered as the same thing, we patented the word "Giant" as a Trade-Mark, as applied to either metal or chain. Trade-Mark Registered April 16, 1878, and October 22, 1878, and our metal is therefore known in the market as "Giant Metal," and our chain as "Giant Metal Sash Chain."

## Columbian

## Sash

## Lock.



Locks three ways with one motion. Simple, strong and durable. Absolutely anti-rattle and burglar proof. Sample by mail, 35c

**COLUMBIAN SASH & DOOR LOCK CO.,**  
WAUSEON, OHIO.

## STRAP HINGES.

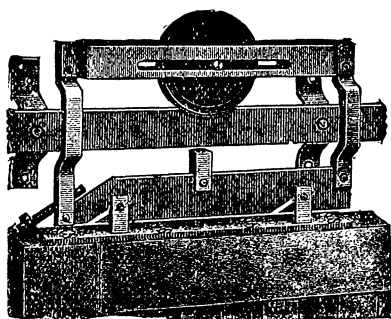
We are not in the Assn. and can make the goods cheaper than any factory in the States or Dominion

Our prices: { 6 inch, \$2.25 per 100 lbs.  
                  8 "     2.15 " 100 "  
                  10 "    2.00 " 100 "

James Mann & Sons, Buffalo N.Y.

## LANE'S PATENT NOISELESS STEEL

## PARLOR DOOR HANGER.



This Hanger is made of Steel.  
The Wheel is also Steel, except the filling or tread.  
The Track is of Steel—a single one only.  
The Hanger is Anti-Friction.  
More nearly Noiseless than any other.  
Ease of adjustment.

Can be erected with half the labor others require.  
Track will not swell, shrink or warp out of true.  
No cutting of doors.  
No matching of hardware.  
Simplicity in all its parts.  
Durability.

ALSO LANE BARN DOOR HANGER AND TRACK. SEND FOR CIRCULARS.

Manufactured by

**LANE BROS., Poughkeepsie, N. Y.**

**JOHN H. GRAHAM & CO., General Agents, 113 Chambers St., New York.**

## PATENT PERFECTION PADLOCK.

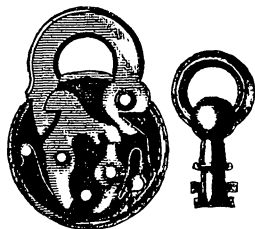
*Eight Tumblers, Key Turning Both Ways.*

Sizes,  $\frac{1}{4}$  inch to  $2\frac{1}{4}$  inches, of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also,  $\frac{1}{2}$  and  $\frac{3}{4}$  inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world.

Adopted by the United States Treasury for bonded warehouses.

**AMES SWORD CO., Chicopee, Mass.**

Send for Price-Lists and Circulars.



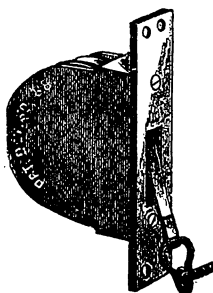
## DOES IT PAY?

To buy an inferior article, which your trade condemns, when you can get

## THE CALDWELL SASH BALANCE.

The best material, right principle and care in making and testing have made it the LEADER for five years. Write to

**CALDWELL MFG. CO., Rochester, N. Y.**



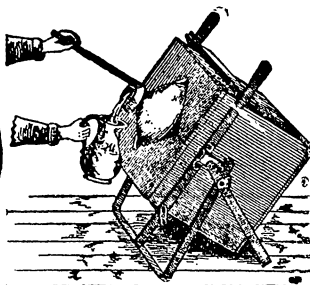
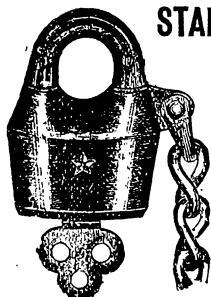
**STAR LOCK WORKS, PHILA.**

**W. & L. WOLF,**

MANUFACTURERS OF  
1st QUALITY ONLY  
SCANDINAVIAN

AND  
Spring Padlocks,  
Trunk & Case Locks,  
Carboy Stands, &c.

Catalogues Sent on Application.



## WHY USE WOODEN OR HEAVY STEEL BLOCKS

WHEN THE STEEL AND IRON

## TACKLE BLOCKS

—MADE BY—

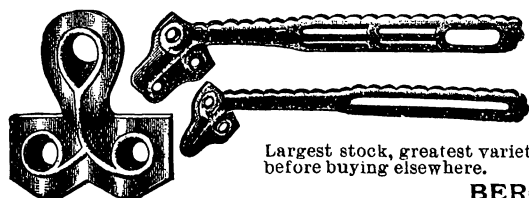
**The Cleveland Block Co.,**

CLEVELAND, OHIO, U. S. A.,

**ARE BETTER IN EVERY WAY.**

No waste material. Every ounce of weight in the line of strength. No clumsy outside straps or bolts. As light as wooden blocks and vastly more durable. They wear, but never break. Sheaves interchangeable.

General Agents: Topping Brothers, 92 Chambers Street, New York.  
New England Agents, - Dodge, Haley & Co., 212 High Street, Boston



HEADQUARTERS FOR

**TINNERS' HARDWARE &  
ROOFERS' SUPPLIES.**

Largest stock, greatest variety. Prices lower than ever. Write us before buying elsewhere.

**BERGER BROS., Philadelphia.**

## Ideal Sash Pulley

No. 60—65.

AUGER MORTISE—FACE PLATE.

Made with two inch wheel, plain and polished, cone axle bearings, noiseless and easy running; markers on the side to lay off the centers to bore the holes by.

The best and most uniformly made low-priced Sash pulley on the market.

Sample Free.

**STOVER MFG. CO.,**  
145 River St., Freeport, Ill.

## SASH WEIGHTS

**E. E. BROWN & CO.,**

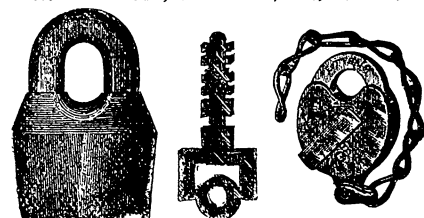
McKean and Meadow Sts.,

**PHILADELPHIA, PA.**

ESTABLISHED 1879.

## KEYSTONE LOCK WORKS.

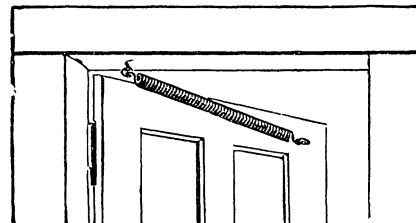
E. T. FRAIM, Lancaster, Pa., U. S. A.



Originators, designers, patentees and manufacturers of all the leading popular styles of **PADLOCKS**, Key-Locking Scandinavian with our patent Inter-Locking Tumblers; the only reliable lock of this style ever made. **SELF-LOCKING** Scandinavian of the highest type of perfection. Dust Proof Railroad, Freight Car and Switch Padlocks. Brass, Bronze, Steel and Malleable Iron Padlocks for all purposes and in all finishes. 131 different kinds. Write for our new 100-page catalogue.

SUPPLESS, DUNN & ALDER, General Agents,  
97 Chambers St., NEW YORK.

## THE PERFECT DOOR SPRING.



Cheap, Simple, Durable, Effective.

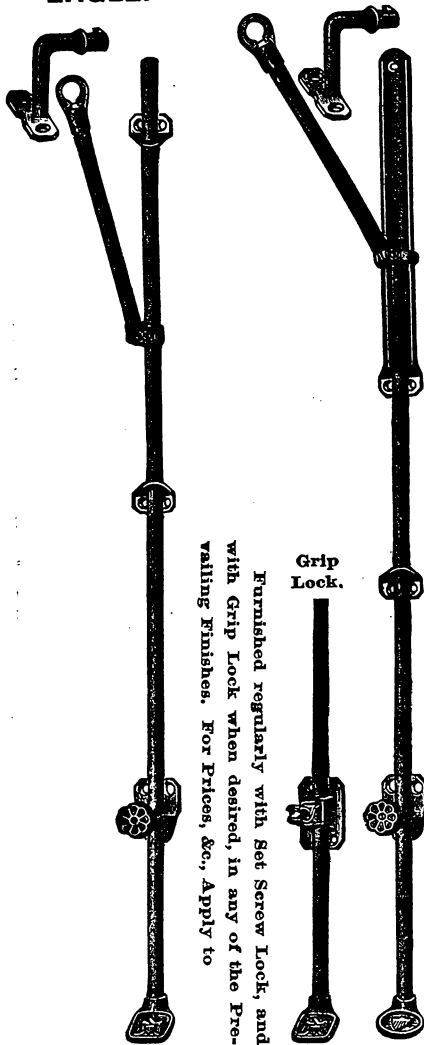
Best Screen Door Spring made. Send for our list of references, comprising some of the first houses in the land. They sell readily, and that is what you are looking for. Drop us a postal.

**COILED WIRE BELTING CO.,**  
40 & 42 Noble St., Jersey City.

**TRANSOMLIFTERS**

"EAGLE."

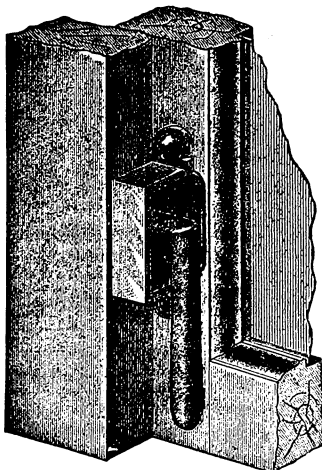
"SHIELD."



**J. F. WOLLENSAK, PATENTEE**  
CHICAGO, ILLINOIS.

**DOLBER'S**  
**SASH FASTENER.**

Patented Aug. 1, 1893.



THE BEST DEVICE EVER INVENTED FOR FASTENING STATIONARY

Screens, Shutters or Windows.

The above shows Fastener as applied to the side of an outside window, fastening same to the outside casing.

Saves Time, Labor and Expense.

Mounted samples by mail 15c.

F. V. WOOSTER, 66 Beverly St., Boston.

**RICHARD ECCLES,**

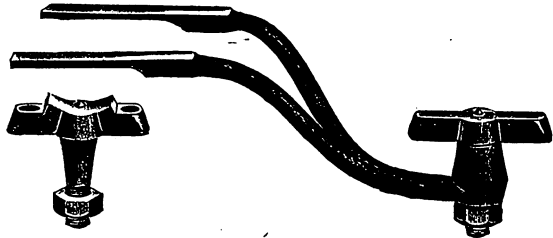
AUBURN, N. Y.,

—MANUFACTURER OF—

**CARRIAGE FORGINGS,**

Couplings, Clips, King Bolts, Fifth Wheels, &amp;c.

SEND FOR SUPPLEMENT TO CATALOGUE



Showing a full line of Axle Clips, Spring Bar Clips, Three Piece Saddle Clips and King Bolt Yokes and Braces.

SEND FOR CATALOGUE AND SUPPLEMENT.

**SASH WEIGHTS!**

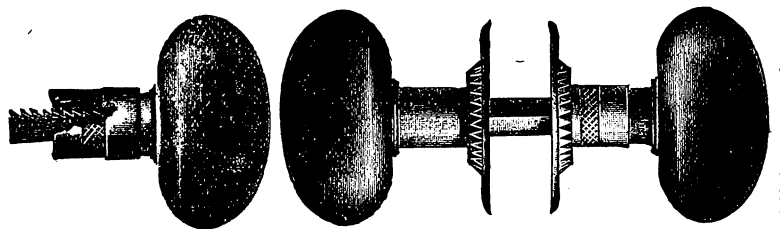
NORTON BROTHERS,

Manufacturers,

Office: 813 Masonic Temple, CHICAGO.

WORKS AT MAYWOOD, ILL.

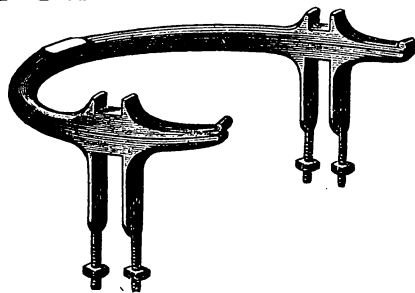
Sectional cut showing construction of Knob.



Half size cut of knob as applied to door. NO SIDE SCREWS OR ADJUSTING WASHERS.

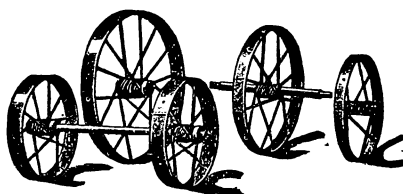
Don't you want your stock to represent the latest and most improved up to date Hardware? The Whipple Patent Door Knob is the latest and best Door Knob attachment ever made. Give it a trial. PERRY & WHIPPLE CO., New Haven, Conn.

New York Sales Agent, E. G. SHEPARD, 142 Chambers Street.

**THE E. D. CLAPP MFG. CO., AUBURN, N. Y.**

Drop Forgings of every kind from Iron or Steel.

Send for New Catalogue of Carriage Forgings.

**WHEELS. WHEELS. WHEELS.**

The best there is made for Wheelbarrows and Trucks. Send for Circular and Prices.

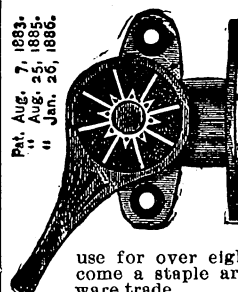
Address

**THE Arnold Metal Wheel Co.**

Mention *The Iron Age*.

New London, Ohio.

Pat. Aug. 7, 1893.  
" Aug. 25, 1893.  
" Jan. 20, 1896.



**The Champion**  
**SIDE**  
**SASH LOCK**

Has by its unequalled merits gained the public favor. It is a safe ventilator and prevents rattling. Is neat, cheap, simple and durable. It has been in extensive use for over eight years, and has become a staple article with the Hardware trade.

Beware of Worthless Imitations.

THE

Champion Safety Lock Co., Cleveland, O.



# BUFFALO SCALE CO., Buffalo, N. Y.

SCALES OF ALL KINDS.

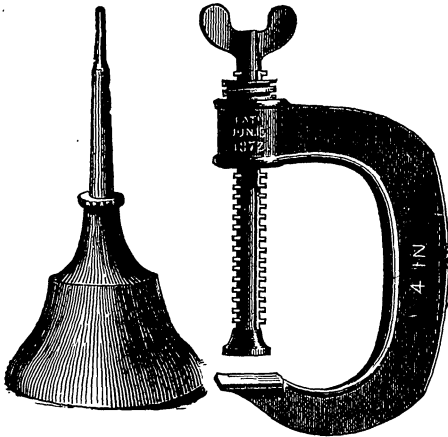
FINISHED ASH AND OAK

## WAGON POLES.

GEO. W. HARTZELL. Wholesale Manufacturer, Greenville, O., U. S. A.

### PATENTED ARTICLES OF MALLEABLE IRON.

NEW pattern Heavy Screw Clamps.  
Strongest in the market.



HAMMER'S MALLEABLE IRON OILERS, 3 Sizes.  
HAMMER'S MALL. IRON HAND LAMPS  
HAMMER'S M. I. HANGING LAMPS.  
HAMMER'S ADJUSTABLE CLAMPS.

For sale by all the principal Hardware Dealers.  
Send for Price-List.

MALLEABLE IRON CASTINGS  
of superior quality, and Hardware Specialties in  
Malleable Iron made to order.

**HAMMER & CO.,**  
Branford, Conn.

### HARDWARE DEALERS

CAN RECOMMEND THE

### CHAMPION METAL WINDOW SASH CHAINS

to their customers as a reliable substitute for  
Sash Cords, very strong and lasting (some in  
daily use ten years), and gives thorough satis-  
faction wherever used. The patented attach-  
ments are very simple and can be applied to  
any window.

MANUFACTURED ONLY BY

**"THOMAS MORTON,"**

65 Elizabeth Street,

Write for Prices.

NEW YORK.

I MAKE a specialty of  
**CAST IRON**  
(not Tin Scrap)

**WASHERS.**

ANY WEIGHT; ANY STYLE.

—Write for Prices.—

JAY HERBERT NEWBURY, Guilderdland, N. Y.



**WM. KROGSRU,**  
Engraver and Die Sinker,  
61 Fulton St., N. Y.  
Manufacturer of  
**STEEL STAMPS**  
For Every Purpose.  
Steel Letters and Figures.  
Burning Brands, Stencils,  
&c. Send for Illustrated  
Catalogue



This Wrench can be furnished with Short Nut.



### COMBINATION WRENCH.

Case-Hardened Throughout. Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the  
requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.  
For Circulars and Price-List, address

**BEMIS & CALL HARDWARE & TOOL CO.,** Springfield, Mass., U. S. A.



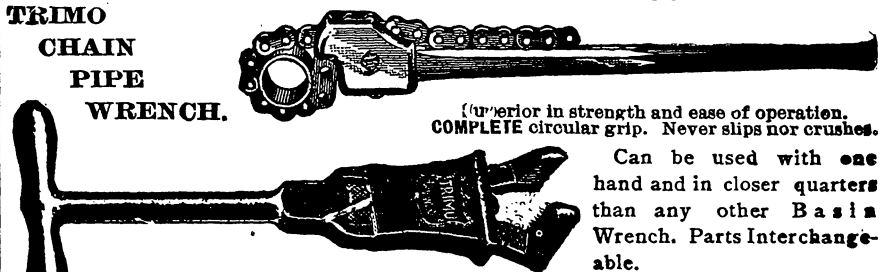
### TRIMO PIPE WRENCH,

Forged Steel.

All parts interchangeable.

Grips firmly without loss of motion. Releases readily. Never locks. Causes no  
trouble in close quarters. Does not crush the pipe.

### TRIMO CHAIN PIPE WRENCH.



(Superior in strength and ease of operation.  
COMPLETE circular grip. Never slips nor crushes.

Can be used with one  
hand and in closer quarters  
than any other Basin  
Wrench. Parts Interchange-  
able.

TRIMO  
BASIN WRENCH.

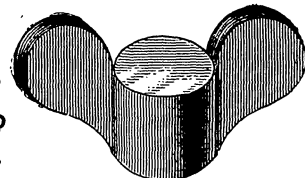
**TRIMONT MFG. CO.,** ROXBURY  
MASS.

### HYDRAULIC FORGINGS

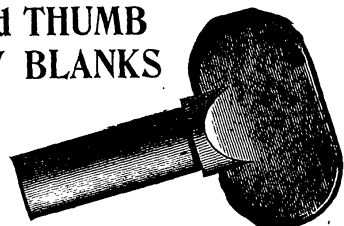


**WYMAN & GORDON,** Worcester, Mass.

### FORGED THUMB NUT and THUMB SCREW BLANKS



Drop  
Forgings  
of Every  
Description



For Bolts from  $\frac{3}{8}$  inch to  $\frac{1}{2}$  inch.

**The Billings & Spencer Co.** Hartford,  
Conn.

Shoulder Thumb Screws.  
Forged Thumb Screws.  
Forged Steel Thumb Screws with  
Black Heads.  
Elevating Thumb Screws.

London House: Chas. Churchill & Co., 21 Cross St., Finsbury.

### BOOKS

THE NEWEST BOOKS ON Iron, Steel and Metallurgy  
Mining, Mechanical and Civil Engineering; Casting and  
Founding; Electricity and Electric Lighting, promptly  
supplied on receipt of price by  
**DAVID WILLIAMS, 96-102 Reade St., New York.**

# "STEEL HORSE SHOES."

SHOENBERGER & CO., PITTSBURGH, PA.,

After numerous and costly experiments have succeeded in manufacturing a special quality of soft homogeneous steel, specially adapted to the manufacture of Horse and Mule Shoes, and are now making from this steel Extra Swaged and Government Pattern Horse and Mule Shoes. They give the best of satisfaction everywhere and we furnish them to the trade at the same prices as the regular iron shoe sold by ourselves and our competitors. We are at present making our Roadster Pattern Horse Shoes out of Iron, but we will make them of Steel also within a short time.



## Juniata Steel Toe Calks.

We would also call your attention to our improved Steel Toe Calk, equal to any in the market. To secure the best wearing qualities, use sand or borax in welding on the Calk and cool off at a dark, or still better, cool off without plunging in water.

No. 1, 2, 3, 4, 5 and 6. Packed in 25 lbs.

Soft Steel Horse Shoe Bar, All Sizes.

## No. 2 EXTRA SWAGED FRONT.

The advantages of these shoes are that, being made of vastly superior material, they will never show signs of red-shortness or cold shortness, will never split in the crease and will always show a much finer finish than any iron shoe.

We make the Steel Shoes lighter than the Iron, giving more shoes to the keg, as follows :

No. 1, 15 more shoes to the keg.	No. 3, 10 more shoes to the keg.
" 2, 14 "	" 4, 8 "
" " "	" " "

And other sizes in proportion.

We also beg to say that we have introduced improved machinery into our new factory and have doubled our capacity, and are now prepared to furnish the best shoe, either iron or steel, ever offered to the trade.

Write to us for information and prices, or apply to jobbers and dealers, who sell them everywhere.

# SHOENBERGER & CO.,

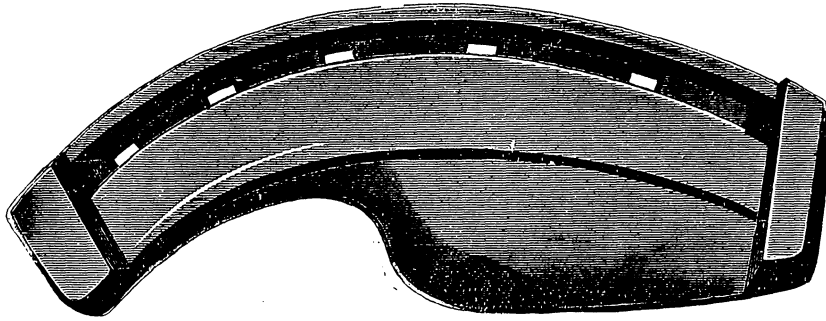
JUNIATA IRON AND STEEL WORKS, - - - PITTSBURGH, PA.

# SCRANTON FORGING CO.,

SCRANTON, PA

## CARRIAGE HARDWARE AND SPECIAL DROP FORGINGS.

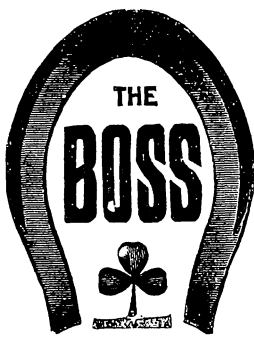
FORGED  
OX  
SHOES.



Made under Deebie's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.



## HORSE AND MULE SHOES.

Superior Quality, Shape and Finish.

BRYDEN HORSE SHOE CO.,  
CATASAUQUA, PA.

RHODE ISLAND PERKINS HORSE SHOE CO.,  
MANUFACTURERS OF

### Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES — X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.  
Works at Valley Falls, R. I. Office, 31 Exchange Place, Providence, R. I.  
F. W. CARPENTER, Pres., C. H. PERKINS, Gen. Manager, R. W. COMSTOCK, Sec'y,  
CHARLES R. STARK, Treas.

J. C. McCARTY & CO., Agents - 97 Chambers Street, New York.

## THE NEW DIAMOND STATE HORSE AND MULE SHOES.

JUST TRY THEM and YOU will say they excel all others.  
MANUFACTURED BY

DIAMOND STATE IRON CO.  
WILMINGTON, DELAWARE

Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blane Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.  
PHILADELPHIA OFFICE, 206 So. Fourth St. { Correspondence invited } NEW YORK OFFICE, 11 Pine St.



Elegant Iron.  
Beautiful Shape.

HORSE SHOES,  
*Light, Medium and Heavy.*  
MULE SHOES,  
*Light, Medium and Heavy.*

Illustrated booklet and prices to all parts of the world on application.

OLD DOMINION IRON AND NAIL WORKS CO.,  
ARTHUR B. CLARKE, President.

Chicago Office, 45 La Salle St

Richmond, Va., U. S. A.

## BURDEN'S

## HORSE SHOES.

"Burden Best"

Iron

Boiler Rivets.

The Burden Iron Co.

TROY, N. Y.

## PHOENIX HORSE SHOES.

PHOENIX HORSE SHOE CO.,

ROLLING MILLS AND FACTORIES,

Poughkeepsie, N. Y.

Joliet, Ill.

NEW YORK OFFICE, No. 66 Reade St.

## Standard Horse Shoe Co.,

Manufacturers of

## HORSE AND MULE SHOES.

Made from best quality of Scrap Iron and old Horse Shoes.

4 Liberty Square, Boston, Mass.

# Capewell Horse Nails.

HIGHEST AWARD. GOLD MEDAL.

— OFFICE —

Manufacturers' Building, Midwinter Fair.

SAN FRANCISCO, CAL., July 1st, 1894.

THE CAPEWELL HORSE NAIL CO., Hartford, Conn.

*Gentlemen:*—The official list of awards of the American Exhibitors has been handed to me to-day by the Director-General, and I am pleased to notify you officially that your exhibit received the First Award, which is a gold medal. Yours respectfully,

EDWARD SCOTT, U. S. Commissioner.

At Centennial Exposition AT PHILADELPHIA. **HIGHEST AWARD** At World's Columbian Exposition AT CHICAGO.

TO THE

**PUTNAM**

HOT-FORGED AND HAMMER-POINTED

**HORSESHOE NAILS.**



**REGULAR HEADS** for ordinary creased shoes.

**CITY HEADS**, or short heads for shallow creased shoes.

**COUNTER HEADS** for "Goodenough" shoes.

**FRENCH HEADS** for punched shoes, without creases.



*These Nails are drawn from head to point from the BEST SWEDISH IRON RODS at a welding heat, thus: by percussive hammer blows only; then polished by the water process, without the aid of acids, and hammer-pointed without any rolling or shearing.*

*They are the best because they are made of the best iron, and by the only process in which the iron is treated naturally, and its strength preserved.*

Those who handle only the best goods hold the confidence of their customers.

**Putnam Nail Co., Neponset, Boston, Mass.**

# H. D. SMITH & CO.,

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

## CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

# FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of

# CHAMPLAIN

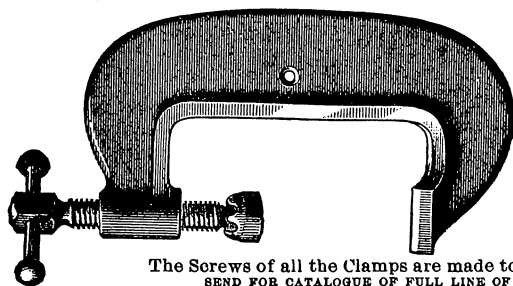
Manufactured by the **NATIONAL HORSE NAIL CO.,**  
VERGENNES, VERMONT.

All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents, New York.

## LE COUNT'S HEAVY STEEL CLAMP.

Extra heavy, with Button on end of screw, hung on a ball so as to accommodate itself to irregularities with out bending the screw. The foot of the Clamp is planed.



No. 1, opening to 2 inch.....	\$1 75
" 2, " 3 ".....	2 00
" 3, " 4 ".....	2 25
" 4, " 5 ".....	2 50
" 5, " 6 ".....	2 75
" 6, " 8 ".....	3 25
" 7, " 10 ".....	3 75
" 8, " 12 ".....	4 25
" 9, " 14 ".....	5 00
" 10, " 16 ".....	6 00
" 11, " 18 ".....	7 00

Full Set, 11 sizes, \$40.50.

Ship or Bridge Clamp with Large Screws.

No. 12 opens 24 inches.....	price, \$12 00
13 " 30 ".....	16 00

The Screws of all the Clamps are made to reach the lower number.  
SEND FOR CATALOGUE OF FULL LINE OF MACHINISTS' TOOLS.

**C. W. LE COUNT, MANUFACTURER, SO. NORWALK, CONN., U. S. A.**

These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St., London, England.

## THE MALIN & CO.

34 and 36 Long St., Cleveland, Ohio,  
Manufacturers and Dealers in Steel, Copper and Brass  
Wire of all kinds.

## Patent Spooled Wire

For Retail Hardware Trade and Wire Specialties.

Dealers who handle it do away with the Broken Bundle Business and sell small quantities by the spool only. It is a convenience for both dealer and consumer. It is Shellac Coated and Cannot Rust: is wound like spool cotton on 1 oz., ¼ lb., ½ lb., 1 lb., and 5 lb. Spools.


Special Wires Spooled for manufacturing purposes. Send for illustrated Catalogue and prices. Sold by all Hardware Dealers.

BOSTON OFFICE,


JOHN WALES & CO., No. 5 Winthrop Sq.



Retail Stock contains 147 Spools.



**P. F. BURKE, C. F. DEWICK & CO.**  
Successor to  
Manufacturer of  
**PATENT STEEL**  
(Blunt and Sharp)  
**TOE-CALKS.**  
—ALSO—  
BURKE'S IMPROVED  
HORSESHOERS'  
FOOT VICE.  
Send for Circulars.  
360 Dorchester Av. Die for Welding  
BOSTON, MASS. Sharp Calks.

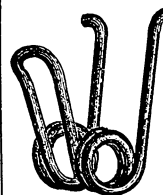


## Crescent

Horse and Mule Shoes,  
BAR IRON.

**CRESCENT HORSE SHOE  
IRON CO.**

Max Meadows, Va.



## FROST'S ANTI-RATTLER

Pat. Jan. 20, 1880.

Cut One-half Size.  
Sample pair sent to any hardware or saddlery firm by addressing

The Frost Thill Spring Co.,  
Boston, Mass.

**THE WILCOX & HOWE COMPANY,**  
BIRMINGHAM, CONN.

MANUFACTURERS OF

A Full Line of Carriage Hardware

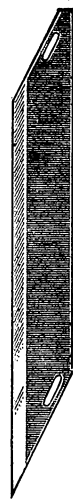
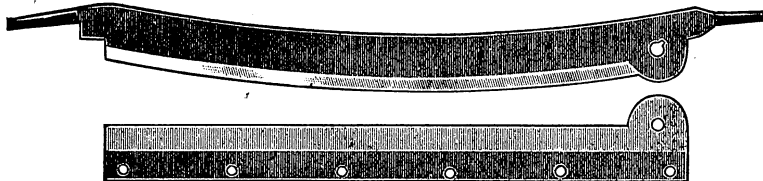
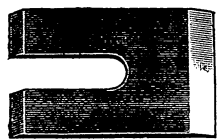
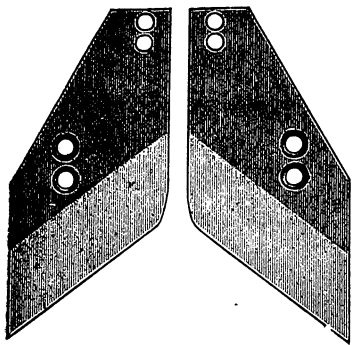
Bicycle and other Drop Forgings of every description made to order.  
Estimates cheerfully given. Send for Catalogue.

# LORING COES & CO.,

WORCESTER, MASS.

## Manufacturers of MACHINE KNIVES.

Shear Blades and Strips, Moulding Cutter Plate, Die Stock for Leather, Cloth and Paper Cutting Dies. Lawn Mower and Hay Cutter Knives of every description.



• IMPROVED MINE LAMP •  
FOR ANTHRACITE AND  
BITUMINOUS  
MINING.  
6 DIFFERENT  
STYLES  
OF SPOUTS.  
SAMPLE 15¢.

SEAMLESS  
BRASS  
COLLAR  
BRASS HINGE  
Lid Solid  
No Soldering

B. E. LEONARD, Scranton, Pa.

## THE "Columbia" Trade-Mark. SOCKET FORKS.

Made in Hay  
Manure and Spad-  
ing Fork Patterns.

Heavy and long  
Steel Socket. Most  
elegant goods ever  
made.

The Iowa  
Farming Tool Co.,

Makers of  
FORKS, HOES,  
RAKES,  
SCYTHE  
SNATHS, Etc.

For export and  
home trade.  
Catalog free on ap-  
plication.

FT. MADISON,  
IOWA, U. S. A

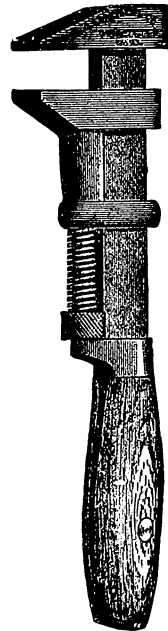
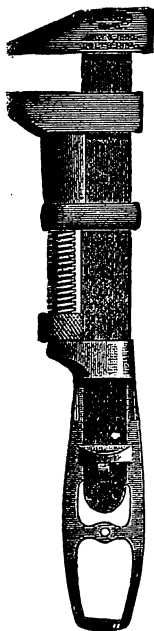


## L. COES'

Genuine Improved  
KNIFE HANDLE  
PATENT

## Screw Wrenches

MANUFACTURED BY  
COES WRENCH CO.,  
WORCESTER, MASS.



Established in  
1839.  
Registered  
March 31, 1874.

Patented July  
8, 1880.  
Patented July  
8, 1884.

Sectional View Illustrates our New Knife Handle, showing Malleable Iron Frame and Shank of Bar keyed into position.

Strait Bar, Extra Long Nut for Screw in Jaw.

The BEST MADE and STRONGEST WRENCH in the MARKET.

J. C. McCARTY & CO., } New York Agents.  
JOHN H. GRAHAM & CO., }

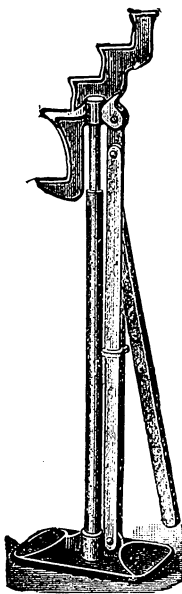
## THE TROY WAGON JACK.

This Jack is superior to all others in the market. It is made in two sizes, No. 555 being intended for use on light wagons, and No. 556 for heavy wagons, although it can be used on any vehicle from the lowest Phaeton to the heaviest truck or brewery wagon. Its lifting capacity is greater than any other Jack manufactured, and being made of iron it is indestructible. No. 555 weighs 7 pounds. No. 556 weighs 10 pounds. It is easily handled and operated, and is the cheapest first-class Wagon Jack offered to the trade.

The flat solid base is a great improvement over Jacks having a ring or rim base, as it cannot settle in the ground when in use, or tip when lifting a heavy load.

Sold by all Leading Jobbers in General and Saddlery Hardware at Manufacturers' Prices.

COVERT MFG. CO.,  
WEST TROY, N. Y.



**BOOKS.** YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, New York.



ESTABLISHED IN 1848.

INCORPORATED IN 1877.

# Withington & Cooley Manufacturing Co.,

JACKSON, MICHIGAN, U. S. A.,

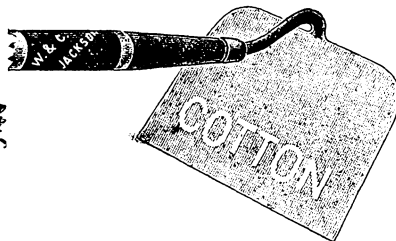
—MAKERS OF—

Forks, Hoes, Garden Rakes, Potato Hooks, Scythe  
Snaths, Grain Cradles, Handles, Wheelbarrows, &c.

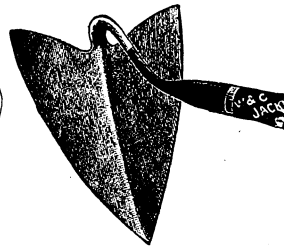
## High Grade Southern Hoes.



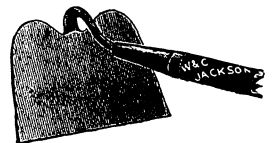
HANDLED PLANTERS'.



COTTON.



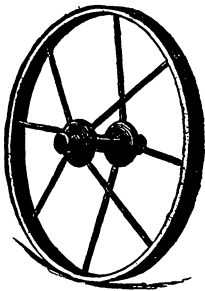
WARREN.



BOYS'.

## Toledo Wheelbarrow Works,

TOLEDO, OHIO.

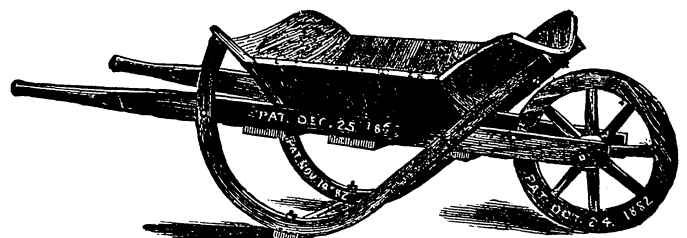


The cut at the left illustrates our new steel wheel that we put on our higher or finer grade barrows. With it we offer twice the strength that the ordinary barrows usually possess. Write for details of construction and prices.

G. W. THOMAS &amp; CO.

## BENT LEG NO. 0.

PATENT JOINTLESS AND BOLTED.



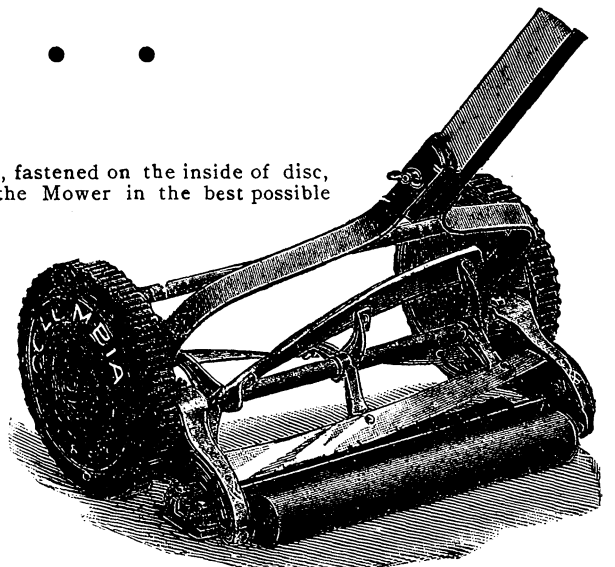
# COLUMBIA. . . .

The connecting bar of this Mower is a  $\frac{5}{8}$  cold drawn steel shaft, fastened on the inside of disc, with tempered steel set screws; this, with a cutter bar fastened into the Mower in the best possible way, makes it strong and rigid.

The reel runs in long polished brass boxes, adjusted by single screw at each end. The best tempered steel is used, and bearings are adjustable, compensating for all wear. The best malleable iron is used in the roller arms and reel spiders.

Instead of a ratchet, we use a clutch that is positively noiseless, on which there is no wear, as it is either fully engaged or entirely out of the way; the clutch is engaged by the forward motion of the drivers only—no springs or extra pieces to wear out or get lost.

A Floating Handle is quickly adjusted for a child or tall person or for cutting down a terrace, simply by a thumb-nut acting on a notched clamp on the handle and handle irons.



WRITE FOR DISCOUNTS TO  
F. S. Anderson & Co., Richmond, Ind.

# D R A G

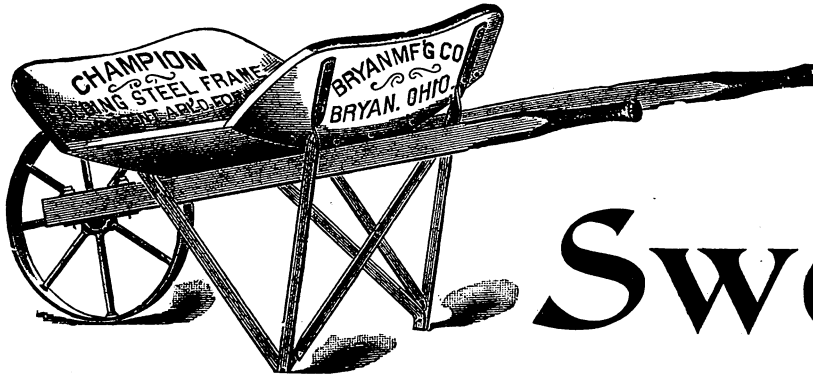
SCRAPERS  
AND  
WHEEL-  
BARROWS.

All styles and sizes at bottom prices. For the dealer, the contractor and user. If looking for the best, we are headquarters.

Sidney Steel Scraper Co.,



924 Poplar St.,  
SIDNEY, OHIO.



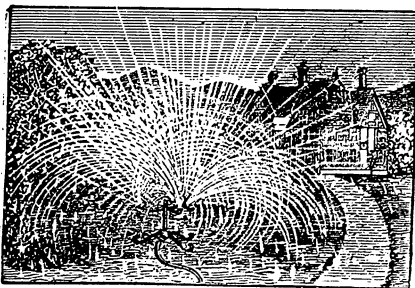
# Don't Swear

at your  
manufact-

urer or jobber because the goods he sent you on your order come back or cause complaint after selling them yourself. It's of no use. If you wish to be on the safe side, however, in the Wheelbarrow line you want to get our prices and samples. The address is

**BRYAN, OHIO.**

GENUINE  
"CALIFORNIA"  
Lawn Sprinkler.



MANUFACTURED BY  
**BLAIR MANUFACTURING CO.**  
SPRINGFIELD, MASS.

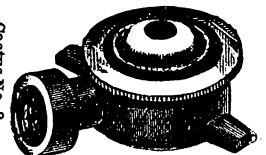
Write for prices.  
Also makers of the most complete line of  
Lawn Mowers on the market.



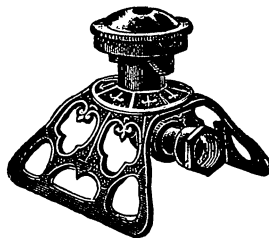
Japanese No. 12,  
Adjust.

## LAWN SPRINKLERS.

Cactus No. 9.



The only Sprinklers which have no revolving parts to leak or wear out.  
The only Sprinklers free from small holes, and which cannot become clogged with gritty substances.  
The only Sprinklers which are adjustable and will give a spray as fine as the mist of Niagara, or as heavy as the area of the supply pipe.  
The best Sprinklers for high pressures, and the only sprinklers which will give satisfaction with low pressures  
We also manufacture the old style revolving sprinklers, but for our own use would not have them

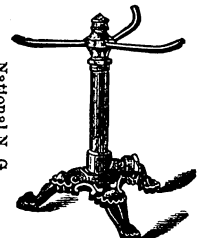


Cactus No. 6.

**Ette & Henger Mfg. Co.**

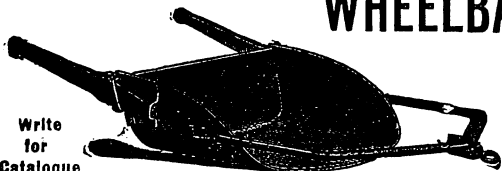
ST. LOUIS, MO.

SEND FOR DESCRIPTIVE CIRCULARS.



National N. 9.

## ALL STEEL WHEELBARROWS & SCRAPERS

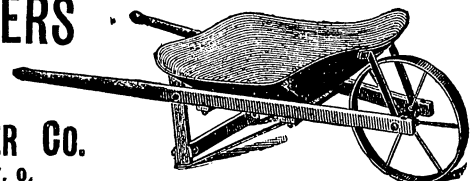


Write  
for  
Catalogue

MANUFACTURED BY

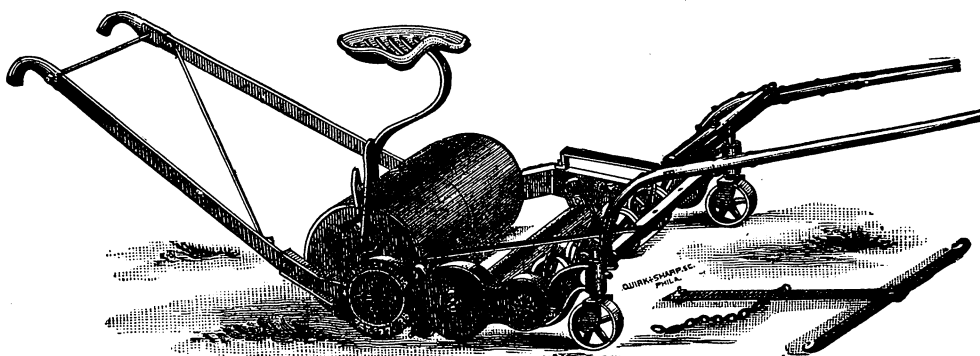
**AMERICAN STEEL SCRAPER CO.**

104 Court Street, SIDNEY, O.



# PENNSYLVANIA HORSE LAWN MOWERS.

Made in  
both open  
and solid  
cylinder.



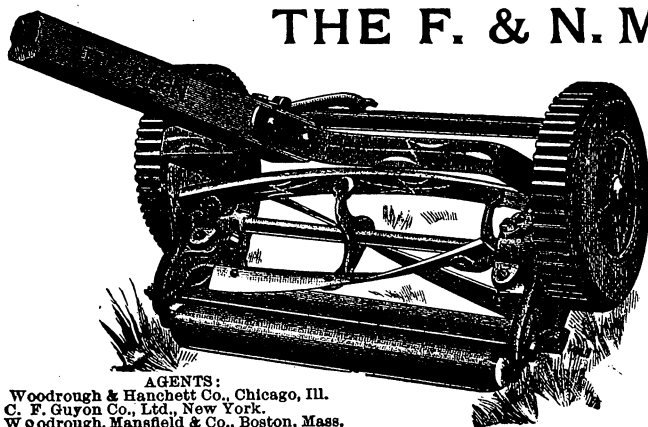
Almost  
noiseless  
in  
operation

Conceded by all who have used them to be the best and most durable Horse Mower on the market.

LIST, OPEN CYLINDER WITH DRAFT IRONS, \$110.00.  
" SOLID " " " " 100.00.

PLEASE WRITE FOR DISCOUNTS.

**SUPPLEE HARDWARE CO., - PHILADELPHIA.**



**THE F. & N. MFG. CO.,**

Manufacturers of  
Lawn Mowers  
and  
Grass Catchers  
RICHMOND, IND., U. S. A.

**THE  
F. & N.  
LAWN  
MOWER  
" '94. "**

Solid Steel Cutter Bar. Reel  
Knives adjusted to Cutter  
Bar. Phosphor Bronze Reel  
Bearings.

AGENTS:  
Woodrough & Hanchett Co., Chicago, Ill.  
C. F. Guyon Co., Ltd., New York.  
Woodrough, Mansfield & Co., Boston, Mass.

**Chadborn & Coldwell  
Mfg. Co.,**

NEWBURGH, N. Y.,  
—Sole Manufacturers of—



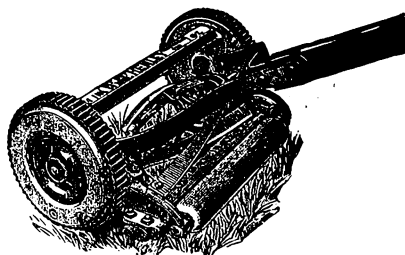
New Model  
AND  
Excelster  
LAWN  
MOWERS  
ALSO  
The Rival,  
The O K,  
Etc., Etc.

Send for Illustrated Catalogue.

## HENLEY'S MOWERS

For Lawns and Parks

Are first class, high grade machines,  
made of the best materials, neat,  
symmetrical, strong and unexcelled  
in construction and ease of oper-  
ation. Does perfect work. For  
prices, address



**M. C. HENLEY, Sole Mfr., Richmond, Ind., U. S. A.**

EASTERN REPRESENTATIVES: H. S. Earle, 110 and 112 N. Warren St., Syracuse, N. Y.; Wm. H. Cole & Sons, 13 S. Charles St., Baltimore, Md.; Carpenter & Bayles 91 Chambers St., New York City.

### THE TEST OF 2 SEASONS

PROVES THE SUCCESS OF THE  
LITTLE GIANT

**Traveling Lawn Sprinkler.**

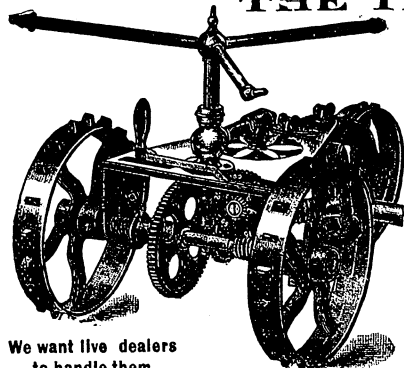
PATENTED.

Can be set to travel anywhere from 15 to 500 feet per hour, either on a straight line or in a circle, and can be gauged to throw water over a swath 5 to 50 ft. in width. Highest Award at World's Columbian Exhibition.

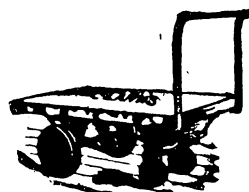
SEND FOR CIRCULAR.

**Portland Lawn Sprinkler Co.,**

PORTLAND, ME.



We want live dealers  
to handle them.



TRUCKS of all  
kinds. Mounted  
on rubber or  
iron wheels. Trucks  
made to order.  
Write for prices.  
Catalogues free.

G. P. CLARK, Box 0,  
Windsor Locks Conn

GET THE BEST!



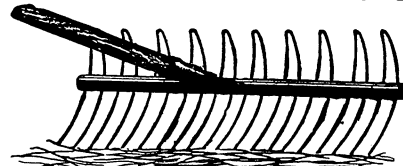
**THE STAR  
COIL SPRING SHAFT SUPPORT  
AND ANTI-RATTLER.**

Fast selling, always gives satisfaction. No  
weight on horse. Worth twice the cost for conven-  
ience in hitching up. Agents wanted. Send stamp  
for circular. Price, \$1.50. State rights for sale.

THE DECATUR SHAFT SUPPORT CO.  
Decatur, Ill.

SELLS AT SIGHT!

### The Old Reliable.



A DIFFERENCE IN MATERIAL  
MAKES

A MATERIAL DIFFERENCE.

So any but Kohler's Lawn Rakes make a difference—  
insist on your jobber and allow no substitute of post  
hole diggers, lawn rakes, curry combs, saw sets, etc.  
Manufactured only by

**F. E. KOHLER & CO., - - Canton, O.**

Hercules. Pioneer, Invincible, Universal, Little  
Giant and Champion are the Post Hole Diggers. Manu-  
factured only by

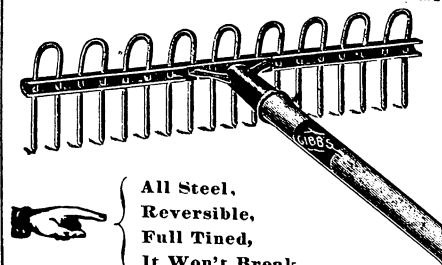
**F. E. KOHLER & CO., - - Canton, O.**

RAKES AND POST HOLE DIGGER.

We have led on the production of this year. Koh-  
ler's Diggers and Lawn Rakes are the lines you want  
for good sales and satisfaction.

**F. E. KOHLER & CO., - - Canton, O.**

### THE "BOSS" GARDEN RAKE.



All Steel,  
Reversible,  
Full Tined,  
It Won't Break.

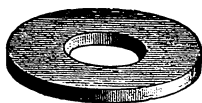
SEND FOR PRICES.

**GIBBS MFG. CO., Canton, Ohio.**

Electric Toy Making, Dynamo Building and Elec-  
tric-Motor Construction. By T. O'CONOR SLOANE,  
A.M., E.M., Ph.D. This work treats of the mak-  
ing at home of electrical toys, electrical appar-  
atus, motors, dynamos, and instruments in general  
and is designed to bring within the reach of young  
and old the manufacture of genuine and useful  
electrical appliances. The work is specially dis-  
signed for amateurs and young folks. Very fully  
illustrated.....\$1.00

For sale by David Williams 96-102 Reade St., N. Y.

# WROUGHT WASHERS



True  
to  
Gauge

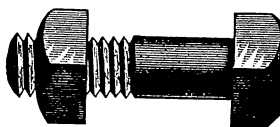
Made from *specially rolled plate* by our own *patented machinery*.

Every washer *flat*, with hole in *true center*. Sold in 200 lb. kegs, or 1 and 5 lb. paper boxes.

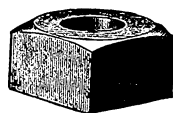
Get prices.

THE MILTON MANUFACTURING CO., MILTON, PA.

## HIGH GRADE



Machine  
Bolts



Hot pressed  
Nuts

Stamped to size. Guaranteed extra quality.  
Send for catalogue.

# Pennsylvania Bolt & Nut Co.

Lebanon Pa.

MANUFACTURERS OF

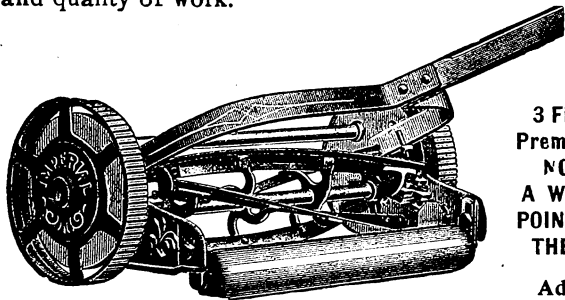
REFINED BAR-IRON · MACHINE-BOLTS · TRACK-BOLTS · & BOLT-ENDS ·  
LAG-SCREWS · GIMLET-POINTED COACH-SCREWS · HOT PRESSED & COLD PUNCHED SQUARE & HEXAGON NUTS ·  
CHAMFERED & TRIMMED NUTS · WROUGHT & CAST WASHERS · TURN-BUCKLES ·  
STRUCTURAL & ELECTRICAL FORGINGS · BOILER & BRIDGE RIVETS · CAR FORGINGS & ARCH-BARS ·

## COLDWELL LAWN MOWER CO., NEWBURCH, N. Y.

### THE BEST IN THE WORLD.

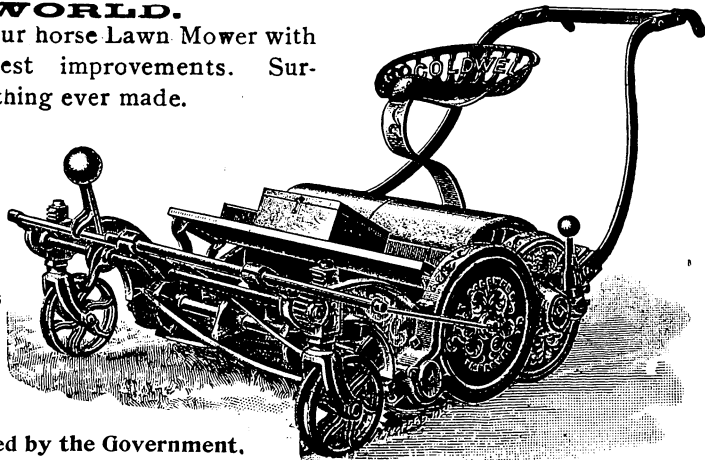
This is our hand mower that was awarded the **Highest Premium** and attracted so much attention at Chicago, for its lightness of draught, durability and quality of work.

This is our horse Lawn Mower with all the latest improvements. Surpasses anything ever made.



3 First  
Premiums  
NOT  
A WEAK  
POINT IN  
THEM.

Adopted by the Government.



## BLAIR'S HUSKING GLOVES.

New Pat. Perfect fit with lots of room. Insist on having Blair's. Take no others. They are the best leather and best shape and cheapest on the market. Their oil tan will not harden by wearing. Husking Pins that will not bend.

ASK YOUR JOBBER  
FOR THEM.



No. 138 Goat,  
\$9 doz.  
No. 152 Oil  
Calf, \$8 doz.  
Back View.  
For all styles.

No. 140 Oil Calf,  
\$9 doz.  
No. 154 Yellow  
Lea, \$7.50.  
No. 142 Real  
Napa Goat, \$7 doz.

No. 150 Oil  
Calf, \$9 doz.  
No. 155 Hog,  
.... doz.

No. 170,  
Oil Calf,  
\$2 doz.

No. 165,  
\$10.50  
gross.

No. 160,  
\$7  
gross.

New Rivet  
Glove.  
All rivets.  
Never rips  
Double  
thumb.  
No sewed  
seams.  
Extra heavy  
oil tan calf.  
No.  
N. R. G.,  
\$12  
per doz.

# Port Chester Bolt & Nut Co.,

**PORT CHESTER, N. Y.**

MANUFACTURERS OF

Cold Punched, Chamfered and Trimmed, Case-Hardened  
and Semi-Finished



NUTS FOR RAILROADS, CAR BUILDERS', LOCOMOTIVE BUILDERS' AND MACHINISTS'  
USE A SPECIALTY.

CORRESPONDENCE SOLICITED.

ESTABLISHED 1865.

**J. H. Sternbergh & Son,** READING, PENNA.

**Bolts, Nuts, Washers, Rivets.**

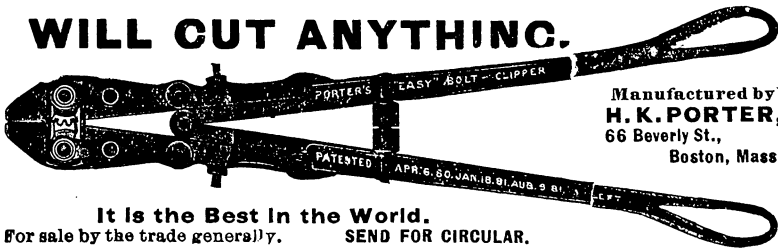
Send for our New Catalogue and Discounts.

## We Manufacture Machine Screws.

Electric and Chandelier trade a specialty.

**NEW ENGLAND SCREW CO.,** 14 Mt. Washington Ave.  
BOSTON, MASS.

## THE "EASY" BOLT CLIPPER WILL CUT ANYTHING.



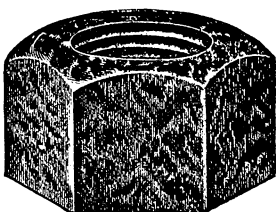
It is the Best in the World.  
For sale by the trade generally. SEND FOR CIRCULAR.

23,000 Sold.

**BOOKS.** YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing **DAVID WILLIAMS**, Publisher and bookseller, 96-102 Reade St. New York

**DUNHAM NUT CO.,**  
UNIONVILLE, CONN.,  
Manufacturers of

All Grades  
of  
Finished  
Nuts  
and



Automatic Cold Press Nut Machines.

SEND FOR CATALOGUE.

### EXPANSION BOLTS.

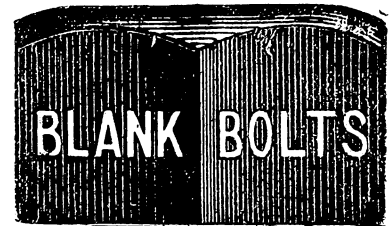


Manufacturers of Single and Double,  
For fastening all kinds of Structure to Brick and Stone  
Work. Catalogue furnished on application.  
**STEWART & ROMAINE MFG. CO.,** - Philadelphia.

**HARVEY HUBBELL,**  
Machinery and Tools Mfr.  
**SCREWS**  
Machine Screws for electrical purposes. Sample box free. Send for circular.  
**BRIDGEPORT, CONN.**

L

## LAG SCREWS



COTTON AND WOOLEN MILLS AND MACHINERY MANUFACTURERS.

AMERICAN-BOLT-CO.-  
MANUFACTURERS  
LOWELL MASS

BOLTS OF ALL KINDS FOR RAILROADS, BRIDGE BUILDERS,



**WASHERS** OF ALL KINDS.

WM. H. HASKELL, PRESIDENT.

E. S. MASON, TREASURER.

D. A. HUNT, AGENT.



GIMLET POINT  
COACH SCREWS



Bolts, Cold-Punched  
Nuts and Washers,  
SUITABLE FOR MACHINERY  
OF ALL KINDS.



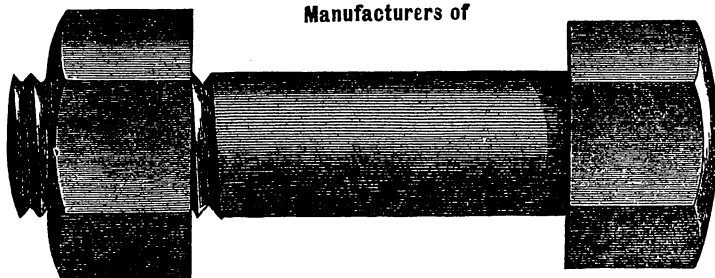
Office and Works: 451 Main St., PAWTUCKET, R. I. U. S. A.  
**HENRY B. NEWHALL CO., Agents,**

105 CHAMBERS STREET, NEW YORK.

- 47 PEARL STREET, BOSTON.

## WORCESTER MACHINE SCREW CO., Worcester, Mass.

SET,  
CAP AND  
MACHINE  
SCREWS.



Manufacturers of

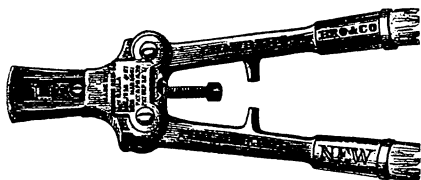
STUDS FOR  
STEAM  
ENGINE,  
PUMPS, &c.

### EXPANSION BOLTS.



For Fastening all kinds of Structure to  
Brick and Stone Work.

Patentee and M<sup>r</sup>. ISAAC CHURCH,  
Send for Catalogue. 1521 Walnut St., TOLEDO, O.



### BOLT & RIVET CLIPPERS,

For cutting off the ends of Bolts and Rivets.  
Liberal discounts to the trade.

### CHAMBERS BROTHERS COMPANY

52d St., BELOW LANCASTER AVE.,  
PHILADELPHIA, PA.

## WM. H. JACOBUS,

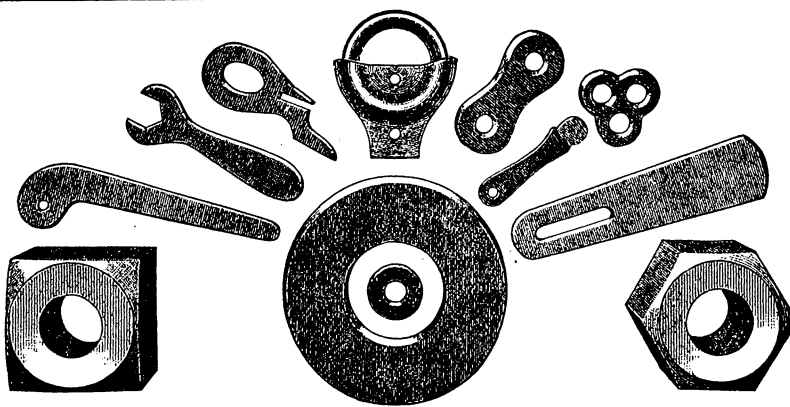
No. 90 Chambers St., New York.

### New York Office of

J. F. Wollensak.  
Barnes Mfg. Co.  
N. R. Streeter & Co.  
Geo. W. Nock.  
Tuck Mfg. Co.  
Henis Vegetable Press.  
Dille & McGuire Mfg. Co.  
Bommer Bros.  
Palmer Hdw. Mfg. Co.  
Wire Goods Co.  
National Rivet Works.  
Wolcott Hdw. Co.  
Fibre Head Mallet.  
Burnside Cedar Faucets.  
Cleveland Window Shade Co.  
Zimmerman's Blind Adjusters.  
Garritt & Beach.  
Wilcox Mfg. Co.  
M. B. Schenck & Co.  
Hemacite Mfg. Co.  
Franklin Mfg. Co.  
Atlas Mfg. Co.  
National Specialty Mfg. Co., Ltd.



Cold Punched Nuts and



Washers for all Purposes.

J. FRED WILSON, Worcester, Mass.

## Metal Punching and Die Work.

Send for prices on Specialties in line of Press Work.



# CLASSIFIED LIST OF ADVERTISERS.

## Agricultural Implements.

Iowa Farming Tool Co., Ft. Madison, Iowa.  
Sickles, Sweet & Lyon, 35 Barclay St., N. Y.  
Wittington & Cooley Mfg. Co., Jackson, Mich.

## Air Compressors.

Norwalk Iron Works, S. Norwalk.

## Air Moving Machinery.

Howard & Morse, 45 Fulton, N. Y.

## Aluminum.

Illinois Pure Aluminum Co., Lemont, Ill.  
Pittsburgh Reduction Co., Pittsburgh.  
Scovill Mfg. Co., Waterbury, Conn.  
Wohler Aluminum Co., Chicago, Ill.

## Aluminum, Brass and Bronze.

Gaylord, F. L. Co., Ansonia, Conn.  
Haight & Clark, Albany, N. Y.  
Pratt & Cady Co., Hartford, Conn.

## Analytical Chemists.

Britton, J. Blodgett, Philadelphia, Pa.  
Moore, Dr. Gideon E., 221 Pearl St., N. Y.

## Anti-Friction Metals.—See Babbitt Metal.

## Anti-Window Rattlers.

Henry, J. T. Mfg. Co., Hamden, Conn.

## Anvil and Vise (Combination).

Fulton Iron & Engine Works, Detroit, Mich.

## Apple Parers.

Goodell Co., Antrim, N. H.

## Arms and Ammunition.

Chicago Fire Arms Co., Chicago, Ill.  
Harrington & Richardson Arms Co., Worcester, Mass.

Hartley & Graham, 313 & 315 Broadway, New York.

Ideal Mfg. Co., New Haven, Conn.

Lovell, Jno. P. Arms Co., Boston, Mass.

Stevens, J. Arms and Tool Co., Chicopee Falls, Mass.

Union Metallic Cartridge Co., 313 & 315 Broadway, N. Y.

## Attorney at Law.

Coleman, I. A., Chicago, Ill.

## Auctioneers.

Bissell, E. Son & Co., N. Y.

## Augers and Bits.

Syracuse Twist Drill Co., Syracuse, N. Y.

## Axes.

Amer. Axe & Tool Co., 280 B'way, N. Y.

Peck, A. G. & Co., Cohoes, N. Y.

## Axe Wedges.

Wooster, F. V., Boston, Mass.

## Axles, Springs, &c. Manufacturers of.

Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.

Wurster, F. W. & Co., Brooklyn, N. Y.

## Babbitt Metal.

Bridgeport Deoxidized Bronze and Metal Co., Bridgeport, Conn.

Crown Smelting Co., Chester, Pa.

Hertz, T. & Son, St. Louis, Mo.

Keys, W. W. & R. M. Co., Bridgeport, Conn.

Reeves, Paul S., Philadelphia, Pa.

## Bakers and Roasters.

Bronson Supply Co., Cleveland, Ohio.

## Bale Ties.

Kilmer Mfg. Co., Newburg, N. Y.

## Barb Wire and Fence.

Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.

Indiana Wire Fence Co., Crawfordsville, Ind.

Kilmer Mfg. Co., Newburg, N. Y.

Ludlow-Saylor Wire Co., St. Louis, Mo.

Washburn & Moen Mfg. Co., Worcester.

## Bar Iron, Manufacturers of.

Etna Standard Iron & Steel Co., Bridgeport, Ohio.

Allentown Rolling Mill, Allentown, Pa.

Burden Iron Co., Troy, N. Y.

Crescent Horse Shoe & Iron Co., Max Meadows, Va.

Montour Iron & Steel Co., Danville, Pa.

Mahoning Valley Iron Co., Youngstown, Ohio.

Sternbergh, J. H. & Son, Reading, Pa.

## Barrel Openers.

Am. Specialty Co., Hartford, Conn.

## Bellows, Manufacturers of.

Scott, Geo. M., Chicago, Ill.

## Bells.

Bevin Bros. Mfg. Co., East Hampton.

## Belt Dressing.

Jos. Dixon Crucible Co., Jersey City, N. J.

## Belt Fasteners.

Bristol Co., Waterbury, Conn.

Claffen Mfg. Co., Cleveland, Ohio.

Talcott, W. O., Providence, R. I.

## Beltling, Makers of.

Alexander Bros., 412 N. 3d, Phila.

Jeffrey Mfg. Co., Columbus, O.

Link-Belt Engineering Co., Phila., Pa.

Main Belting Co., Philadelphia, Pa.

N. Y. Belting & Packing Co. Ltd., N. Y.

Roberts Mfg. Co., Pittsburgh, Pa.

Shultz Belting Co., St. Louis, Mo.

## Bicycles and Bicycle Sundries.

Bevin Bros. Mfg. Co., E. Hampton, Mass.

Black Mfg. Co., Erie, Pa.

Bridgeport Gun Implement Co., 313-315 Broadway, New York.

Crawford Mfg. Co., Hagerstown, Md.

Eagle Bicycle Mfg. Co., Torrington, Ct.

Grand Rapids Cycle Co., Grand Rapids, Mich.

League Cycle Co., Hartford, Conn.

Lovell, Jno. P. Arms Co., Boston, Mass.

Pope Mfg. Co., Boston, Mass.

Stearns, E. C. & Co., Syracuse, N. Y.

## Bicycle Parts.

New Britain Hdw. Mfg. Co., New Britain, Conn.

## Bit Braces.

Amidon Tool Corp., Buffalo, N. Y.

## Bits and Braces.

Fray, Jno., S. & Co. Bridgeport, Conn.

## Blocks, Tackle, Makers of.

Cleveland Block Co., Cleveland, O.

Fulton Iron & Engine Works, Detroit, Mich.

Union Hardware Co., Torrington, Ct.

## Blowers.

Buffalo Forge Co., Buffalo, N. Y.

Champion Blower & Forge Co., Lancaster, Pa.

Huvett & Smith Mfg. Co., Detroit, Mich.

Sturtevant, B. F. & Co., Boston, Mass.

## Boiler Plates.

Carbon Steel Co., Pittsburgh, Pa.

McIlwain, Wm. & Sons, Reading, Pa.

Lukens Iron & Steel Co., Coatesville, Pa.

Pottstown Iron Co., Pottstown, Pa.

## Boilers, Copper.

Randolph & Clowes, Waterbury, Conn.

## Boilers, Steam.

Babcock & Wilcox Co., 80 Cortlandt.

Chandler & Taylor Co., Indianapolis, Ind.

Harrison Safety Boiler Wks., Phila., Pa.

Pollock, W. B. & Co., Youngstown, O.

Porter, H. K., Boston, Mass.

Southwark Fdy. & Mch. Co., Phila., Pa.

Harrington Co., Chicago, Ill.

Wetherill, Robt. & Co., Chester, Pa.

## Boat Cutters.

Chambers Bros. Co., Philadelphia.

Howard Iron Works, Buffalo, N. Y.

Porter, H. K., Boston, Mass.

Wells Bros. & Co., Greenfield, Mass.

## Books.

Republic Press, 14 Lafayette Place, N. Y.

Williams, David, 96-102 Reade, N. Y.

## Box Banders.

Goodell, J. W., Burlington, Vt.

## Box Straps and Corners.

Cary Mfg. Co., 5 to 9 Elm St., N. Y.

## Boxes, Hdw. Shell, &c.

Green, A. H., 22 Park Place, N. Y.

Jones, Jesse & Co., Philadelphia, Pa.

## Brass, Manufacturers of.

Ansonia Brass & Copper Co., N. Y.

Davis, John & Sons, 100 John, N. Y.

Plume & Atwood Mfg. Co., N. Y.

Randolph & Clowes, Waterbury, Conn.

Rome Brass & Copper Co., Rome, N. Y.

Scovill Mfg. Co., Waterbury, Conn.

Waterbury Brass Co., 296 B'way, N. Y.

## Brass Butt Hinges.

Tiebout, W. & J., 16 & 18 Chambers.

## Brass Foundries.

Cramp, Wm. & Sons S. & E. B. Co., Philadelphia, Pa.

Eynons-Evans Mfg. Co., Philadelphia, Pa.

Fraun, E. T., Lancaster, Pa.

Haight & Clark, Albany, N. Y.

Keys, W. W. & R. M. Co., Bridgeport, Conn.

North Bros. Mfg. Co., Phila., Pa.

Reeves, Paul S., Philadelphia, Pa.

## Brass Goods.

Brass Goods Mfg. Co., 88 Chambers.

## Bread and Cake Knives.

Christy Knife Co., Fremont, O.

Cincinnati Mfg. Co., Cincinnati, O.

Clauss Shear Co., Fremont, O.

## Bronze (Tobin).

Ansonia Bronze & Copper Co., 19-21 Cliff Street, N. Y.

## Brooms and Brushes.

Lay, Jos. & Co., Ridgeville, Ind.

Rice Mfg. Co., New Durham, N. H.

## Builders' Hardware.

Deltz, A. E., 97 Chambers St., N. Y.

Reading Hdw. Co., Reading, Pa.

Russell & Erwin Mfg. Co., New York

Yale & Towne Mfg. Co., Stamford, Ct.

## Burr Wheels.

Torrance Iron Co., Troy, N. Y.

## Butchers' Steels.

Chatillon, John & Sons, 85-89 Cliff St., N. Y.

Hoffman, C. & A., Philadelphia, Pa.

Nichols Bros., Greenfield, Mass.

## Butcher and Shoe Knives, Manufacturers of.

Chatillon, John & Sons, 85-89 Cliff St., N. Y.

Goodell Co., Antrim, N. H.

Nichols Bros., Greenfield, Mass.

Wilson, John, Sheffield, England.

## Butts and Hinges.

Clark Mfg. Co., Buffalo, N. Y.

McKinney Mfg. Co., Allegheny, Pa.

Mann, Jas. & Sons, Buffalo, N. Y.

Sabin Machine Co., Montpelier, Vt.

Stanley Works, New Britain, Conn.

Tiebout, W. & J., 16 Chambers, N. Y.

Wrightsville Hdw. Co., Wrightsville, Pa.

## Calf Wenners.

Carroll Muzzle Co., Carroll, Ia.

## Calipers and Dividers.

J. Stevens Arms and Tool Co., Chicopee Falls, Mass.

Starrett, L. S., Athol, Mass.

## Car Axles.

Roberts, A. & P. & Co., Phila.

## Carboy Stands.

Wolf, W. & L., Philadelphia, Pa.

## Carriage Hardware, Makers of.

Clapp, E. D. Mfg. Co., Auburn, N. Y.

Covert's Saddlery Works, Farmer, N. Y.

Eccles, Richard, Auburn, N. Y.

Scranton Forging Co., Scranton, Pa.

Smith, H. D. & Co., Plantsville, Conn.

## Cartridge Reloading Tools.

Ideal Mfg. Co., New Haven, Conn.

## Carvers' Tools.

White, Van Glahn & Co., 15-17 Chatham Square, N. Y.

## Casters, Wheel, &c.

Clark G. P., Windsor Locks, Conn.

## Castings, Iron and Steel.

Allentown Hdw. Wks., Allentown, Pa.

Booth, The Lloyd Co., Youngstown, O.

Boston Casting Co., So. Boston, Mass.

The Burr & Houston Co., Brooklyn, N. Y.

Cheney, S. & Son., Manlius, N. Y.

Chester Steel Casting Co., Phila.

Chrome Steel Works, Brooklyn, N. Y.

Eureka Cast Steel Co., Chester, Pa.

Flagg, Stanley G. & Co., Phila.

Garland Foundry Co., Cleveland, O.

Haight & Clark, Albany, N. Y.

King & Andrews Co., Chicago, Ill.

Palmer & De Mooy Fdry. Co., Cleveland, O.

Pratt & Cady Co., Hartford, Conn.

Sessions Foundry Co., Bristol, Conn.

Spencer's I. S. Sons, Guilford, Conn.

Standard Fdy. & Mfg. Co., Cleveland, O.

Taylor & Boggis Fdry Co., Cleveland, Ohio.

Torrance Iron Co., Troy, N. Y.

Walker Mfg. Co., Cleveland, Ohio.

Wetherill, Robert & Co., Chester, Pa.

## Castings, Malleable.

Arcade Malleable Iron Co., Worcester, Mass.

Hammer & Co., Branford, Conn.

Torrance Iron Co., Troy, N. Y.

## Catalogue Files.

Folding Paper Box Co., So. Bend, Ind.

## Chains.

Bradlee & Co., Philadelphia.

Garland Chain Co., Rankin, Pa.

Link Belt Engineering Co., Phila., Pa.

McKay, Jas. & Co., Pittsburgh, Pa.

## Chimneys.

Phila. Engineering Works, Phila., Pa.

## Chisels, Manufacturers of.

Buck Bros., Milbury, Mass.

Buck, Chas., Milbury, Mass.

**Egg Beaters.**

North Bros. Mfg. Co., Philadelphia, Pa.  
**Electric Bells and Supplies.**  
 Ostrander, W. R. & Co., 204 Fulton St.,  
 New York.  
 Wollensak, J. F., Chicago, Ill.

**Electric Dynamo Machines.**

Hanson & Van Winkle Co., Newark, N.J.

**Elevators, Makers of.**

Link-Belt Engineering Co., Phila., Pa.  
 Morse, Williams & Co., Phila., Pa.  
 Penna. Elevator Engineering Co.,  
 Phila., Pa.  
 Variety Machine Co., Warsaw, N. Y.  
 Warner Elevator Mfg. Co., Cincinnati,  
 Ohio.

**Emery and Emery Wheels.**

Cutter, Wood & Stevens, Boston, Mass.  
 Diamond Mach. Co., Providence, R. I.  
 N. Y. Belding & Packing Co., Ltd.,  
 N. Y.  
 Northampton Emery Wheel Co.,  
 Leeds, Mass.  
 Norton Emery Wheel Co., Worcester,  
 Mass.  
 Sterling Emery Wheel Co., 174 Fulton  
 St., N. Y.  
 Tanite Co., Stroudsburg, Pa.

**Emery Wheel Dressers.**

Bay State Stamping Co., Worcester,  
 Mass.

**Engineers and Contractors.**

Aiken, Henry, Pittsburgh, Pa.  
 Herrick, J. A., 284 Pearl St., N. Y.  
 Kennedy, Julian, Pittsburgh, Pa.  
 Laughlin, Alex. & Co., Pittsburgh, Pa.  
 Lean, D. R., Co., Pittsburgh, Pa.  
 McClure, Amster & Co., Pittsburgh, Pa.  
 Pittsburgh Iron & Steel Engineering  
 Co., Pittsburgh, Pa.  
 Smythe, S. R. Co., Incorporated, Pitts-  
 burgh, Pa.  
 Swindell, W. & Bros., Pittsburgh, Pa.

**Engines, Gas and Gasoline.**

Buckeye Mfg. Co., Union City, Ind.  
 Otto Gas Engine Works, Phila., Pa.  
 Springfield Gas Engine Co., Springfield,  
 Ohio.

**Engines, Steam, Makers of.**

Allis, E. P. Co., Milwaukee, Wis.  
 Bass Foundry & Machine Works, Ft.  
 Wayne, Ind.  
 Chandler & Taylor Co., Indianapolis,  
 Ind.  
 Harris, Wm. A., Steam Engine Co.,  
 Providence, R. I.  
 Lane & Bodley Co., Cincinnati, Ohio.  
 Norwalk Iron Works Co., So. Norwalk  
 Conn.  
 Phila. Engineering Works, Phila., Pa.  
 Southwark Foundry & Machine Co.,  
 Phila., Pa.  
 Tod, William & Co., Youngstown, O.  
 Totten & Hogg Iron & Steel Fdry. Co.,  
 Pittsburgh, Pa.  
 Wetherill, Robt. & Co., Chester, Pa.

**Exhaust Tumblers.**

Sweetser, W. A., Brockton, Mass.

**Expansion Bolts.**

Boone, W. C. Mfg. Co., Boonton, N. J.  
 Church, Isaac, Toledo, O.  
 Steward & Romaine Mfg. Co., Phila.,  
 Pa.

**Experts.**

Flint & Co., 68 Broad St., N. Y.

**Faucets, Self-Measuring.**

Lane Bros., Poughkeepsie, N. Y.

**Faucets, Wooden, Makers of.**

John Sommer's Son, Newark, N. J.

**Fed-Water Heaters and Purifiers.**

Davis, I. B. & Son, Hartford, Conn.  
 Harrison Safety Boiler Works, Phila.,  
 Pa.

**National Pipe Bending Co., New Haven, Conn.**

Taunton Locomotive Mfg. Co., Taun-  
 ton, Mass.  
 Webster, Warren & Co., Camden, N. J.  
 Whitlock Coil Pipe Co., Elmwood,  
 Conn.

**Fence Ratchets.**

Wire Fence Supply Co., Indianapolis  
 Ind.

**Fencing, Iron and Wire.**

Barnum, E. T., Detroit, Mich.  
 Champion Iron Co., Kenton, O.  
 Chess Bros., Pittsburgh, Pa.  
 Clinton Wire Cloth Co., Clinton, Mass.  
 Gilbert & Bennett Mfg. Co., 42 Cliff St.,  
 Kilmer Mfg. Co., Newburgh, N. Y.  
 McCallip Fence & Wire Wks., Colum-  
 bus, Ohio.  
 The Van Dorn Iron Works Co., Clevel-  
 and, O.  
 Wire Fence Supply Co., Indianapolis,  
 Ind.

**Files, Importers of.**

Moss, F. W., 80 John St., N. Y.

**Files and Rasps, Manufacturers of.**

Arcade File Works, Anderson, Ind.  
 Banker & White, Troy, N. Y.  
 Barnett, G. & H., 41 & 43 Richmond,  
 Phila.  
 McCaffrey File Co., Philadelphia.  
 Nicholson File Co., Providence, R. I.

**Fire Brick, Makers of.**

Borgner, Cyrus, Philadelphia, Pa.  
 Gardner, Jas. & Son, Cun berland, Md.  
 Kreischer, B. & Sons Foot E. Houston  
 St., N. Y.  
 Maurer, H. & Son, 420 E. 23d, N. Y.  
 Ostrander Fire Brick Co., Troy, N. Y.  
 Valentine, M. D. & Bro. Co., Wood-  
 bridge.

**Fire Doors.**

Coburn Trolley Track Mfg. Co., Hol-  
 yoke, Mass.

**Fishing Tackle.**

Dame, Stoddard & Kendall, Boston,  
 Mass.

**Flint and Emery Paper.**

Bae der, Adamson & Co., Phila., Pa.

**Flour Sifters.**

Bromwell Brush & Wire Goods Co.,  
 Cincinnati, Ohio.  
 Meyers, Fred, J. Mfg. Co., Hamilton, O.

**Fodder Cutters.**

Silver Mfg. Co., Salem, O.

**Forges, Portable, &c.**

Buffalo Forge Co., Buffalo, N. Y.  
 Champion Blower & Forge Co., Lan-  
 caster, Pa.  
 Sturtevant, B. F. Co., Boston, Mass.

**Forgings, Iron and Steel.**

Bethlehem Iron Co., S. Bethlehem, Pa.  
 Cambria Steel-Cambria Iron Co.,  
 Johnstown, Pa.  
 Frankford Steel Co., Phila., Pa.  
 Scranton Forging Co., Scranton, Pa.  
 U. S. Projectile Co., Brooklyn, N. Y.

**Forks, Hay and Manure.**

Iowa Farming Tool Co., Ft. Madison  
 Iowa  
 Withington & Cooley Mfg. Co., Jack-  
 son, Mich.

**Foundry Facings.**

Dixon, Jos., Crucible Co., Jersey City,  
 N. J.  
 S. Obermayer Co., Cincinnati, O.  
 Smith's Pattern Works, Akron, Ohio.

**Foundry Riddles.**

Estey, W. S., 85 Fulton, N. Y.

**Foundry Supplies.**

Diamond Clamp & Flask Co., Rich-  
 mond, Ind.  
 S. Obermayer Co., Cincinnati, O.  
 Rice Mfg. Co., New Durham, N. H.  
 Smith, J. D., Fdy. Supply Co., Cinn., O.  
 Smith's Pattern Works, Akron, Ohio.

**Friction Clutches.**

Brown, A. & F., 17 Dey St., N. Y.  
 Keystone Clutch & Mch. Wks., Phila.,  
 Pa.  
 Moore & White Co., Philadelphia, Pa.

**Friction Cone.**

Evans Friction Cone Co., Boston, Mass.

**Galvanized Material.**

Jersey City Galvanizing Co., 112 John  
 St., N. Y.

**Galvanizing Kettles.**

Sands, Thos., Nashua, N. H.

**Gas Producers.**

Wood, R. D. & Co., Philadelphia, Pa.

**Gas & Steam Fitters' Supplies.**

Pancoast, Henry B. & Co., Phila., Pa.

**Gate Hinges.**

Wrightsville Hdw. Co., Wrightsville,  
 Pa.

**Gear Cutters.**

D. E. Whiton Mach. Co., New London,  
 Conn.

**Gears.**

Boston Gear Works, Boston, Mass.  
 Gleason Tool Co., Rochester, N. Y.  
 Lincoln Iron Works, Rutland, N. Y.  
 Poole, Robt. & Son Co., Baltimore,  
 Md.  
 U. S. Projectile Co., Brooklyn, N. Y.

**Glass Cutters.**

Monce, S. G., Bristol, Conn.

**Glue.**

Baeder, Adamson & Co., Phila., Pa.  
 Dodd, A. W. & Co., Gloucester, Mass.  
 Russia Cement Co., Gloucester, Mass.

**Grass Catchers.**

Supplee Hardware Co., Phila., Pa.

**Grate Guards.**

Dow Wire Works Co., Louisville, Ky.

**Grinding and Polishing Ma-**

chines.  
 Cutter, Wood & Stevens, Boston, Mass.  
 Diamond Mach. Co., Providence, R. I.  
 Herrick & Cowell, New Haven, Conn.  
 Norton Emery Wheel Co., Worcester,  
 Mass.

**Grindstone Dressing Machinery**

Blake & Johnson, Waterbury, Conn.

**Grindstones.**

Cleveland Stove Co., Cleveland, O.

**Gun Implements.**

Union Hdw. Co., Torrington, Conn.

**Gunpowder, Makers of.**

Lafin & Rand Powder Co., 29 Murray  
 St., N. Y.

**Handles.**

Cleveland Wood Turning Co., Clevel-  
 and, O.  
 Piqua Handle & Mfg. Co., Piqua, Ohio.

**Hangers, Door.**

Coburn Trolley Track Mfg. Co.,  
 Holyoke, Mass.  
 Lane Bros., Poughkeepsie, N. Y.

**Hardware Comm'n Merchants.**

Graham, John H. & Co., 111 Chambers  
 St., New York.  
 Jacobus, W. H., 90 Chambers, N. Y.

**Hardware Jobbers.**

White, Van Glabn & Co., 15-17 Chat-  
 nam Square, N. Y.

**Hardware Manufacturers.**

Russell & Erwin Mfg. Co., Chambers  
 St., New York.  
 Stearns, E. C. & Co., Syracuse, N. Y.  
 Streeter, N. R. & Co., Groton, N. Y.  
 Union Mfg. Co., 103 Chambers, N. Y.  
 Yale & Towne Mfg. Co., Stamford  
 Conn.

**Hardware Mfrs. Agents.**

Bingham, W. Co., Cleveland, O.  
 Clarke, Thomas, St. John, N. B.  
 Graham, John H. & Co., 113 Chambers  
 Sicksles, Sweet & Lyon, 35 Barclay, N. Y.

**Hardware Specialties.**

Acme Shear Co., Bridgeport, Conn.  
 Berger Bros., Philadelphia, Pa.  
 Clark Mfg. Co., Buffalo, N. Y.  
 Enterprise Mfg. Co., Philadelphia, Pa.  
 Erie & Hanger Mfg. Co., St. Louis, Mo.  
 Gwinner Mfg. Co., Hamilton, O.  
 Johnson, S. C., Racine, Wis.  
 New Britain Hdw. Mfg. Co., New Brit-  
 ain, Conn.  
 North Bros. Mfg. Co., Philadelphia, Pa.  
 Ransom Hdw. Co., Burlington, Vt.  
 Scranton & Co., New Haven, Conn.  
 Shepard, Sidney & Co., Buffalo, N. Y.  
 Wilson, J. Fred., Worcester, Mass.  
 Wrightsville Hdw. Co., Wrightsville,  
 Pa.

**Harness Snaps.**

Covert Mfg. Co., West Troy, N. Y.  
 Coverts' Saddlery Wks., Farmer, N. Y.  
 Fitch, W. & E. T., New Haven, Conn.

**Heaters, Oil and Gas.**

Climax Mfg. Co., Chicago, Ill.

**Hoes.**

Withington & Cooley Mfg. Co., Jack-  
 son, Mich.

**Hoisting Machines.**

Box, Alfred & Co., 314 Green, Phila.  
 Brown Hoisting & Conveying Mch. Co.,  
 Cleveland, Ohio.  
 Byers, Jno. F. Mch. Co., Ravenna, O.  
 Fulton Iron & Engine Wks., Detroit,  
 Mich.

Harrington, E. Son & Co., Phila.

Lane Bros., Poughkeepsie, N. Y.

Lidgerwood Mfg. Co., 96 Liberty, N. Y.

Lincoln Iron Works, Rutland, Vt.

McCoy, Jos. F. & Co., 28 Warren St.

Morris & Beekley, Philadelphia.

Moore Mfg. & Fdy. Co., Milwaukee.

Morse, Williams & Co., Phila.

Sellers, Wm. & Co., Phila. and N. Y.

Speldel, J. G., Reading, Pa.

Yale & Towne Mfg. Co., Stamford, Ct.

**Hollow Ware.**

Avery Stamping Co., Cleveland, O.  
 Bronson Supply Co., Cleveland, Ohio.  
 Cleveland Stamping & Tool Co., Clevel-  
 and, O.

**Hollow Ware, Aluminum.**

Wohler Aluminum Co., Chicago, Ill.

**Horse Nails, Makers of.**

Capewell Horse Nail Co., Hartford,  
 Conn.

National Horse Nail Co., Vergennes,  
 Vt.

Putnam Nail Co., Neponset, Boston,  
 Mass.

**Horse and Mule Shoes, Makers of.**

Bryden Horse Shoe Co., Catsaqua,  
 Pa.

Burden Iron Co., Troy, N. Y.

Crescent Horse Shoe & Iron Co., Max  
 Meadows, Va.

Diamond State Iron Co., Wilmington,  
 Del.

Leonard, J., 446 West St., N. Y.

Old Dominion Iron & Nail Works Co.,  
 Richmond, Va.

Phoenix Horse Shoe Co., Poughkeepsie,  
 N. Y.

Ride Island Perkins Horse Shoe Co.,  
 Providence.

Shoenberger & Co., Pittsburgh, Pa.

Standard Horse Shoe Co., Boston,  
 Mass.

**Hose Menders.**

Hudson, C. E. & Co., Leominster,  
 Mass.

**Hose.**

N. Y. Beiting & Packing Co., Ltd., 15  
 Park Row, N. Y.

**Husking Gloves.**

Blair's Husking Gloves.

**Hydrants, &c.**

McLean, John, 296 & 298 Monroe, N. Y.

**Hydraulic Forging.**

U. S. Projectile Co., Brooklyn, N. Y.

**Hydraulic Jacks.**

Dudgeon, Richard, 24 Columbia, N. Y.

McCoy, Jos. F. Co., 26 Warren St., N. Y.

**Ice Cream Freezers.**

White Mountain Freezer Co., Nashua,  
 N. H.

**Injectors.**

Eynon-Evans Mfg. Co., Philadelphia,  
 Pa.

Jenkins Bros., New York.

Sherwood Mfg. Co., Buffalo, N. Y.

**Insurance, Boiler.**

Hartford Steam Boiler Inspection &  
 Insurance Co., Hartford, Conn.

**Iron and Steel, Swedish.**

Lundberg, Gustaf, Boston, Mass.

Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**

Butze, Adolph, St. Louis, Mo.

Corning, Edw. & Co., 29 B'way, N. Y.

Cotton, Barclay W. & Co., Phila.

Etting, Edw. J., Philadelphia.

Hogan, John L. & Co., Philadelphia, Pa.

Hoffman, J. W. & Co., Philadelphia.

Levis, Henry & Co., Philadelphia.

Keely, Jerome & Co., Philadelphia.

Lea, J. Fatnall & Co., Philadelphia.

Mohr, J. J., 430 Walnut, Philadelphia.

Pilling & Crane, Philadelphia, Pa.

Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**

Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**

Barns, C. K. & Co., Philadelphia, Pa.

Borden & Lovell, 70 West, N. Y.

Bussenius & Cunliffe, Philadelphia.

Cornig, Edw. & Co., 29 B'way, N. Y.

Cox, Justice, Jr., Philadelphia.

Cotton, Barclay W. & Co., Phila.

Hoffman, J. W. & Co., Philadelphia.

Leonard, J., 446 West St., N. Y.

Nicols, Wheeler & Co., Philadelphia.

Ogden & Wallace, 577 to 583 Green-  
 wich St., N. Y.

Pierson & Co., 29 Broadway, N. Y.

Pierson, W. H. & Co., Phila., Pa.

Wallace, Wm. H. & Co., 60 B'way, N. Y.

Whitney, A. R. & Co., 17 B'way, N. Y.

Wilson, E. H. & Co., Philadelphia.

**Iron, Importers.**

Abbott, Wheelock & Co., N. Y. and  
 Boston.  
 Lundberg, Gustaf, Boston, Mass.

**Iron, Sheet, Manufacturers of.**

Cambridge Iron & Steel Co., Cam-  
 bridge, Ohio.  
 W. Dewees Wood Co., Lim., McKees-  
 port, Pa.

**Ironwork, Ornamental.**

Barnum, E. T., Detroit, Mich.  
 Champion Iron Co., Kenton, O.  
 Ludlow-Saylor Wire Co., St. Louis, Mo.  
 The Van Dorn Iron Works Co., Clevel-  
 and, O.

**Keys.**

Wollensak, J. F., Chicago, Ill.

**Knife and Tool Grinders.**

Tracy, A. J. Co., Ltd., 18 Cliff St., N. Y.

**Ladles.**

- Place, Geo., 145 Broadway, N. Y.  
 Poole, Robt. & Son Co., Baltimore, Md.  
 Powell Planer Co., Worcester, Mass.  
 Prentiss Tool & Supply Co., N. Y.  
 Scranton Supply & Mchry. Co., Scranton, Pa.  
 Seibert, J. M., Philadelphia, Pa.  
 Sellers, Wm. & Co., Phila.  
 Seyfert's Sons, L. F., Philadelphia, Pa.  
 Sigourney Tool Co., Hartford, Conn.  
 Steptoe, J. & Co., Cincinnati, O.  
 Stow Flexibite Shaft Co., Ltd., Phila.  
 Toomey, Frank, Philadelphia, Pa.  
 Walker Mfg. Co., Cleveland, O.  
 Wetherill, Robert & Co., Chester, Pa.  
 Wilson, W. A., Rochester, N. Y.
- Machinery for Hardware Manufacturers.**  
 Add. Jno. & Son, New Haven, Conn.
- Machine Knives.**  
 Loring, Coes & Co., Worcester, Mass.  
 Simonds Mfg. Co., Fitchburg, Mass.
- Machine Screws.**  
 Rubbell, Harvey, Bridgeport, Ct.  
 New Britain Hdw. Mfg. Co., New Britain, Conn.  
 Rhode Island Tool Co., Providence, R.I.
- Machine Tools.**—See Machinery.
- Machine Work.**  
 Papping, J., 58th St. & 11th Ave., N. Y. City.
- Machinists' Scales.**  
 Coffin & Leighton, Syracuse, N. Y.  
 Starratt, L. S., Athol, Mass.
- Machinists' Tools and Supplies.**  
 King, J. M. & Co., Waterford, N. Y.  
 Sellers, Wm. & Co., Inc., Phila.
- Manufacturing Sites.**  
 Chicago, O., Milwaukee & St. Paul R.R., Chicago, Ill.
- Meat Choppers.**  
 Enterprise Mfg. Co., Philadelphia, Pa.
- Meat Cutters.**  
 North Bros. Mfg. Co., Philadelphia, Pa.
- Mechanical Instruction.**  
 Correspondence School of Mechanics, Scranton, Pa.
- Metals.**  
 Pearing, Wm. S., 100 Chambers, N. Y.  
 Hendricks Bros., 49 Cliff, N. Y.
- Metal Brokers.**  
 American Metal Co., N. Y.
- Metallic Ceilings.**  
 Penn. Iron Roofing & Corrugating Co., Phila., Pa.
- Metallurgists.**  
 Britton, J. Blodgett, Phila., Pa.
- Mining Knives.**  
 Palmer Hdw. Mfg. Co., Troy, N. Y.
- Mine Lamps.**  
 Darby, Edw. & Sons, Phila., Pa.  
 Leonard, B. E., Scranton, Pa.
- Mining Screens.**  
 Harrington & King Perforating Co., Chicago, Ill.  
 Howard & Morse, 45 Fulton, N. Y.
- Mining Machinery.**  
 Allis, B. P. Co., Milwaukee, Wis.
- Models, Makers of.**  
 Franklin, H. H. Mfg. Co., Syracuse, N. Y.  
 Ideal Machine Works, Hartford, Conn.
- Molding Sand.**  
 Obermayer, S. Co., Cincinnati, O.
- Money Drawers.**  
 Columbian Novelty Co., North East, Penna.  
 Wadell Wooden Ware Wks., Greenfield, Ohio.
- Motors, Water and Electric.**  
 Boligiano Mfg. Co., Baltimore, Md.  
 C. & C. Electric Co., 402 and 404 Greenwich St., N. Y.  
 Dallett, Thomas H. & Co., Phila., Pa.
- Nail Keg Stock.**  
 Crescent Mfg. Co., Detroit, Mich.
- Nail Machinery.**  
 Pittsburgh Mfg. Co., Pittsburgh, Pa.
- Nail and Tack Pullers.**  
 Am. Specialty Co., Hartford, Conn.  
 Scranton & Co., New Haven, Conn.
- Nails (Cut) and Spikes.**  
 Borden & Lowell, 70 West, N. Y.  
 Pottstown Iron Co., Pottstown, Pa.  
 Riverside Iron Wks., Wheeling, W. Va.
- Nickel Platers' Supplies.**  
 Hanson & VanWinkle Co., Newark, N. J.  
 Zucker & Levett & Loeb Co., 10 to 14 Grand St., N. Y.
- Nickel Plating.**  
 Rhodes, L. E. Co., Hartford, Conn.
- Norway Shapes, Rollers of.**  
 Rowland, William & Harvey, Frankford, Philadelphia.
- Novelty Manufacturers.**  
 Franklin, H. H. Mfg. Co., Syracuse, N. Y.  
 Ideal Machine Works, Hartford, Conn.
- Nut Machines.**  
 Dunham Nut Co., Unionville, Ct.
- Nuts, Bolts, &c., Makers of.**  
 American Bolt Co., Lowell, Mass.  
 American Screw Co., Providence, R.I.  
 Blake & Johnson, Waterbury, Conn.  
 Dunham Nut Co., Unionville, Conn.  
 Haskell, Wm. H. Co., Pawtucket, R. I.  
 Mt. Carmel Bolt Co., Mt. Carmel, Conn.  
 Pennsylvania Bolt & Nut Co., Lebanon, Pa.  
 Port Chester Bolt & Nut Co., Port Chester, N. Y.  
 Rhode Island Tool Co., Providence, R.I.  
 Russell, Burdiss & Ward, Port Chester, N. Y.  
 Sternbergh, J. H. & Son, Reading, Pa.  
 Wilson, J. Fred., Worcester, Mass.  
 Wm. H. Haskell Co., Pawtucket, R. I.
- Oil Cups and Lubricators.**  
 Sherwood Mfg. Co., Buffalo, N. Y.
- Oilers.**  
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Oil Stones.**  
 Pike Mfg. Co., Pike Station, N. H.
- Orange Shears.**  
 Henry, J. T. Mfg. Co., Hamden, Conn.
- Ores.**  
 Wister, Francis, Philadelphia, Pa.
- Ox Shoes.**  
 Millers Falls Co., 93 Reade St., N. Y.  
 Scranton Forging Co., Scranton, Pa.
- Packing.**  
 Morrison, Robert, St. Louis, Mo.  
 N. Y. Belting & Packing Co., Ltd., N. Y.
- Padlocks.**  
 Ames Sword Co., Chicopee, Mass.  
 Fram, E. T., Lancaster, Pa.  
 Wolf, W. & L., Phila., Pa.
- Pills.**  
 Richmond Cedar Wks., Richmond, Va.
- Paint Burners.**  
 Dangler Stove & Mfg. Co., Cleveland, Ohio.
- Paint Cans.**  
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Pants Stretcher.**  
 Covert Mfg. Co., West Troy, N. Y.
- Patent Solicitors.**  
 Butler, C. N., Phila., Pa.  
 Jenner, H. W. T., Washington, D. C.  
 Howson & Howson, Philadelphia and Washington.  
 Stocking, E. B., Washington, D. C.
- Pattern Letters.**  
 Wells, Heber, 157 William St., N. Y.
- Perforated Metal.**  
 Clinton Wire Cloth Co., Clinton, Mass.  
 Harrington & King Perforating Co., Chicago, Ill.  
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.
- Phosphor Bronze.**  
 Phosphor Bronze Smelting Co., Limited, Philadelphia.
- Phosphor Tin.**  
 Crescent Phosphorized Metal Co., Philadelphia, Pa.  
 Halk & Naumann, 516 Pearl, N. Y.
- Picks and Mattocks.**  
 Plumb, Fayette R., Philadelphia, Pa.
- Pig Iron.**  
 Houston, C. B. & Co., Philadelphia, Pa.  
 Montour Iron & Steel Co., Danville, Pa.  
 Naylor & Co., 45 Wall, N. Y.  
 Pilling & Crane, Philadelphia, Pa.  
 Samuel, Frank, Philadelphia, Pa.
- Pig Iron Storage.**  
 Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.
- Pile Drivers.**  
 Vulcan Iron Works, Chicago, Ill.
- Pipe, Bent.**  
 National Pipe Bending Co., New Haven, Conn.
- Pipe Cutting and Threading Machines.**  
 Armstrong Mfg. Co., Bridgeport, Conn.  
 Bignall & Keeler Mfg. Co., St. Louis, Mo.  
 Detrick & Harvey Mch. Co., Baltimore, Md.  
 Merrill Mfg. Co., Toledo, O.  
 Pancoast, Henry B. & Co., Phila.  
 Saunders, Sons, D., Yonkers, N. Y.  
 Walworth Mfg. Co., Boston, Mass.
- Pipe Grips.**  
 Prentiss Vise Co., 44 Barclay, N. Y.
- Pipes, Fittings, &c., Makers of.**  
 McNab & Harlin Mfg. Co., N. Y.
- Pipe, Water and Gas, Makers of.**  
 Donaldson Iron Co., Emaus, Pa.  
 Riverside Iron Works, Wheeling, W. Va.  
 Wood, R. D. & Co., Philadelphia, Pa.
- Plane Irons, Manufacturers of.**  
 Buck Bros., Millbury, Mass.  
 Buck, Chas., Millbury, Mass.
- Planers.**  
 Detrick & Harvey Mch. Co., Baltimore, Md.  
 New Haven Mfg. Co., New Haven, Conn.  
 Powell Planer Co., Worcester, Mass.  
 Wilson, W. A., Worcester, Mass.
- Planes, Manufacturers of.**  
 Stanley Rule & Level Co., N. Y.
- Plated Ware.**  
 Boardman, L. & Son, New Haddam, Ct.  
 Hobbes & Edwards Silver Co., Bridgeport, Conn.  
 Rogers, Wm. Mfg. Co., Hartford, Ct.
- Plate, Iron and Steel, Mfrs. of.**  
 Almond Standard Iron & Steel Co., Bridgeport, O.  
 Lukens Iron & Steel Co., Coatesville, Pa.  
 Mahoning Valley Iron Co., Youngstown, Ohio.  
 Moorhead-McLean Co., Pittsburgh, Pa.  
 McIlvaine & Sons, Reading, Pa.  
 Pottstown Iron Co., Pottstown, Pa.  
 Pottsville Iron & Steel Co., Pottsville, Pa.  
 Singer, Nimick & Co., Pittsburgh, Pa.  
 The Mahoning Valley Iron Co., Youngstown, O.  
 Wood, Alan Co., Philadelphia.
- Plating, Nickel, Brass and Silver.**  
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Polishing Machines.**  
 Watson & Stillman, 204 E. 43d, N. Y.
- Post Hole Diggers.**  
 Gibbs Mfg. Co., Canton, Ohio.  
 Kohler, F. E. & Co., Canton, O.
- Poultry Nettings.**  
 Barnum, E. T., Detroit, Mich.  
 Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.  
 N. J. Wire Cloth Co., Trenton, N. J.  
 "Silver Finish."  
 Tyler Wire Works Co., W. S., Cleveland, O.  
 Wright & Colton Wire Cloth Co., Worcester, Mass.
- Powder.**  
 Ladin & Rand Powder Co., 29 Murray, New York Powder Co., 62 Liberty St., N. Y.
- Power Hammers.**  
 Diemet & Eisenhardt, Philadelphia.  
 Dupont Mfg. Co., St. Johnsbury, Vt.  
 Jenkins & Linkle, Bellefonte, Pa.  
 Long & Allstatter Co., Hamilton, Ohio.  
 Miner & Peck Mfg. Co., New Haven, Conn.  
 Scranton & Co., New Haven, Conn.
- Power Transmitting Machinery.**  
 Dodge Mfg. Co., Mishawaka, Ind.
- Presses, Dies, &c.**  
 E. W. Bliss Co., Brooklyn, N. Y.  
 Crosby, G. A. & Co., Chicago, Ill.  
 Ferracute Mch. Co., Bridgeport, N. J.  
 Stark Mch. & Tool Co., Buffalo, N. Y.  
 Stiles & Parker Press Co., Brooklyn, N. Y.  
 Waterbury Mch. Co., Waterbury, Ct.
- Presses, Power, Makers of.**  
 Bliss, E. W. Co., Brooklyn, N. Y.  
 Manville, E. J. Mch. Co., Waterbury, Ct.  
 Mannman, A. H., Meriden, Conn.  
 Stark Mch. & Tool Co., Buffalo, N. Y.  
 Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
- Printers.**  
 Griffith, Axtell & Cady Co., Holyoke, Mass.
- Pulleys.**  
 Brown, A. & F., 17 Dey St., N. Y.  
 Dodge Mfg. Co., Mishawaka, Ind.  
 Keystone Clutch Mch. Wks., Phila., Pa.  
 Reeves Pulley Co., Columbus, Ind.
- Pulverizing Mills.**  
 Bradley Pulverizer Co., Boston, Mass.
- Pumping Machinery.**  
 Dean Bros. Steam Pump Works, Indianapolis, Ind.  
 Goulds Mfg. Co., Seneca Falls, N. Y.  
 Hooker-Colville Steam Pump Co., St. Louis, Mo.  
 Lucas, C. O. & Co., Greenville, Ohio.  
 McGowan, J. H. & Co., Cincinnati, O.  
 Maslin, J. & Son, Jersey City, N. J.  
 Norwalk Iron Works Co., So. Norwalk, Conn.  
 Southwick Fdy. & Mch. Co., Phila., Pa.  
 Valley Pump Works, Easthampton, Mass.  
 Worthington, Henry R., 86 and 88 Liberty St., N. Y.
- Pumps, Makers of.**  
 Deming Co., Salem, O.  
 Douglas, W. & B., Middletown, Conn.  
 Goulds Mfg. Co., Seneca Falls, N. Y.  
 Miller, C. & Sons, Utica, N. Y.  
 Myers, F. E. & Bro., Ashland, O.  
 Peters Pump Co., Kewanee, Ill.  
 Red Jacket Mfg. Co., Davenport, Iowa.
- Punches.**  
 Richards, I. P., Providence, R. I.
- Punches and Shears, Hand and Power.**  
 Bertsch & Co., Cambridge City, Ind.  
 E. W. Bliss Co., Brooklyn, N. Y.  
 Crosby, G. A. & Co., Chicago, Ill.  
 Ferracute Mch. Co., Bridgeport, N. J.  
 Henderson, A. L., Wilmington, Del.  
 Long & Allstatter Co., Hamilton, Ohio.  
 Stark Mch. & Tool Co., Buffalo, N. Y.  
 Stiles & Parker Press Co., Brooklyn, N. Y.  
 Wais & Roos Punch & Shear Co., Cincinnati, Ohio.  
 Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.  
 Watson & Stillman, 204 E. 43d, N. Y.
- Rails, Old and New.**  
 Perry, W. H. & Co., Providence, R. I.
- Rat and Mouse Traps.**  
 Estey, W. S., 65 Fulton, N. Y.  
 E. celisor Cutlery Co., Worcester, Mass.
- Reels.**  
 Hendryx, A. B. Co., New Haven, Conn.
- Refrigerator Door Fasteners.**  
 Conroy, P. J. & Co., Philadelphia.
- Rivers.**  
 Blake & Johnson, Waterbury, Conn.  
 Burden Iron Co., Troy, N. Y.  
 Clark & Cowles, Plainville, Conn.  
 Cobb & Drew, Plymouth, Mass.  
 New England Screw Co., Boston, Mass.  
 Sternbergh, J. H. & Son, Reading, Pa.  
 Townsend, W. P. & Co., New Brighton, Pa.
- Riveting Machines.**  
 Add. Jno. & Son, New Haven, Conn.
- Rolling Mill Machinery.**  
 Birmingham Iron Fdry, Birmingham, Ala.  
 Booth, The Lloyd Co., Youngstown, O.  
 Leeburg Foundry & Mch. Co., Pittsburgh, Pa.  
 Morgan Construction Co., Worcester, Mass.  
 Robinson-Rea Mfg. Co., Pittsburgh, Pa.  
 Totten & Hogg Iron and Steel Fdry., Pittsburgh, Pa.  
 Trethewey Mfg. Co., Pittsburgh, Pa.  
 Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.
- Rolls, Chilled, Sand and Steel.**  
 Birmingham Iron Foundry, Birmingham, Ala.  
 Booth, The Lloyd Co., Youngstown, O.  
 East Chicago Fdry Co., Chicago, Ill.  
 Garrison, A. Fdry Co., Pittsburgh, Pa.  
 Robinson-Rea Mfg. Co., Pittsburgh, Pa.  
 Seaman, Sletth & Black, Pittsburgh, Pa.  
 Totten & Hogg Iron and Steel Fdry., Pittsburgh, Pa.
- Roll Paper Holders.**  
 Am. Roll Paper Co., St. Louis, Mo.  
 Streeter, N. R. & Co., Groton, N. Y.
- Roofing.**  
 Cambridge Roofing Co., Cambridge, O.  
 Cincinnati Corrugating Co., Piqua, O.  
 N. Y. Iron Roofing & Corrugating Co., Jersey City, N. J.
- Rope and Web Goods.**  
 Covert Mfg. Co., West Troy, N. Y.  
 Covert's Saddlery Wks., Farmer, N. Y.
- Rope Wheels.**  
 Cresson, Geo. V. Co., Philadelphia, Pa.
- Rubber Goods.**  
 Canfield, H. O., Bridgeport, Conn.
- Rules, Manufacturers of.**  
 Stanley Rule & Level Co., 29 Chambers.
- Rust Preventive.**  
 Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.
- Sad Irons.**  
 Enterprise Mfg. Co., Phila., Pa.  
 Streeter, N. R. & Co., Groton, N. Y.
- Sad Irons, Gas.**  
 Boligiano Mfg. Co., Baltimore, Md.
- Sample Holder.**  
 Massey & Thompson, Monroe City, Mo.
- Sand Paper.**  
 Baeder, Adamson & Co., Phila., Pa.
- Sash Balances.**  
 Caldwell Mfg. Co., Rochester, N. Y.  
 Pullman Sash Balance Co., Rochester, N. Y.
- Sash Cords and Chains.**  
 Morton, Thos., 45 Elizabeth, N. Y.  
 Ossawan Mills Co., Norwich, Conn.  
 Samson Cordage Works, Boston, Mass.  
 Smith & Egge Mfg. Co., Bridgeport.
- Sash Fasteners.**  
 Wooster, F. V., Boston, Mass.
- Sash Locks.**  
 Champion Safety Lock Co., Cleveland, Ohio.  
 Columbian Sash & Door Lock Co., Wauseon, Ohio.  
 Ives, H. B. & Co., New Haven, Conn.
- Sash Pulleys.**  
 Palmer Hardware Mfg. Co., Troy, N. Y.
- Sash Weights.**  
 Brown, E. E. & Co., Philadelphia, Pa.  
 Norton Bros., Chicago, Ill.
- Saw Filing Machines.**  
 Diston, Henry & Sons, Philadelphia, Pa.
- Saws, Makers of.**  
 Atkins, E. C. & Co., Indianapolis, Ind.  
 Butler Mfg. Co., Boston, Mass.  
 Diston, Henry & Sons, Phila., Pa.  
 National Saw Co., 98 Reade St., N. Y.  
 Simonds Mfg. Co., Fitchburg, Mass.
- Saw Vises.**  
 Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Saw Sets.**  
 Taintor Mfg. Co., 84-86 Chambers, N. Y.
- Scales, Manufacturers of.**  
 Buffalo Scale Co., Buffalo, N. Y.  
 Chaffillon, John & Sons, 85-89 Cliff, N. Y.
- Scrapers, Road.**  
 Am. Steel Scraper Co., Sydney, Ohio.  
 Sidney Steel Scraper Co., Sydney, O.
- Screens, Coal and Ore.**  
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.
- Screw Cutting Machinery.**  
 Wells Bros. & Co., Greenfield, Mass.  
 Wiley & Russell Mfg. Co., Greenfield, Mass.
- Screw Drivers.**  
 Brown, R. H. & Co., New Haven, Conn.  
 Gay & Parsons.  
 Mayhew, H. H. Co., Shelburne Falls, Mass.
- Screw Plate and Pipe Cutter.**  
 Jarecki Mfg. Co., Erie, Pa.
- Screws, Makers of.**  
 American Screw Co., Providence, R. I.  
 Blake & Johnson, Waterbury, Conn.  
 Wm. H. Haskell Co., Pawtucket.  
 Miles, F. S., 20 Quarry, Philadelphia.  
 New England Screw Co., Boston, Mass.  
 Reynolds & Co., New Haven, Conn.  
 Worcester Machine Screw Co., Worcester, Mass.
- Scroll Saws.**  
 Barnes, W. F. & John, Rockford, Ill.  
 Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Seal Stone and Whetstones.**  
 Pike Mfg. Co., Pike Station, N. H.  
 Cleveland Stone Co., Cleveland, O.
- Sewer Pipes.**  
 Sharon Clay Mfg. Co., Sharon, Pa.
- Shade Hangers.**  
 South, W. A. Co., Salem, Mass.
- Shaft Coupling.**  
 Columbian Novelty Co., North East, Penna.
- Shafting, Makers of.**  
 Brown, A. & F., 17 Dey St., N. Y.  
 Cresson, Geo. V. Co., Philadelphia, Pa.  
 Fairmount Mch. Co., Philadelphia, Pa.  
 Sellers, Wm. & Co., Inc., Phila., Pa.  
 Stow Mfg. Co., Binghamton, N. Y.
- Shaft Support.**  
 Decatur Shaft Support Co., Decatur, Ill.
- Shaped Iron and Steel, Manufacturers of.**  
 Atina-standard Iron & Steel Co., Bridgeport, O.  
 East Chicago Fdry Co., Chicago, Ill.

- Allentown Rolling Mill, Allentown, Pa.**  
Lockhart Iron & Steel Co., Pittsburgh, Pa.  
Passaic Rolling Mill Co., Paterson, N.J.  
Pottsville Iron & Steel Co., Pottsville, Pa.  
Roberts, A. & P. & Co., Phila., Pa.  
The Phoenix Iron Co., Phila., Pa.  
Tudor Iron Works, St. Louis, Mo.
- Shears and Scissors.**  
Acme Shear Co., Bridgeport, Conn.  
Claus Shear Co., Fremont, Ohio.  
Heinrichs, R. Sons Co., Newark N. J.
- Sheet Iron and Steel, Manufacturers of.**  
Atna-Standard Iron and Steel Co., Bridgeport, O.  
Cambridge Iron & Steel Co., Cambridge, Ohio.  
Jersey City Galvanizing Co., 112 John St., N. Y.  
Mahoning Valley Iron Co., Livingston, Ohio.  
Morehead-McCleane Co., Pittsburgh.  
Pierson & Co., 29 Broadway, N. Y.  
Singer, Nimick & Co., Ltd., Pittsburgh, Pa.  
The Mahoning Valley Iron Co., Youngstown, O.  
Alan Wood Co., Philadelphia.  
W. Dewees Wood Co., McKeesport, Pa.
- Sheet Zinc.**  
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Shelf Brackets.**  
Atlas Mfg. Co., New Haven, Conn.  
Stanley Works, New Britain, Conn.
- Show Cases.**  
Union Show Case Co., Chicago, Ill.
- Sinks.**  
Douglas, W. & B., Middletown, Conn.
- Skates, Ice.**  
Dane, Stoddard & Kendall, Boston, Mass.  
Keene Mfg. Co., Keene, N. H.  
Winslow, Saml., Skate Mfg. Co., Worcester, Mass.
- Skates, Roller.**  
Henley, M. C., Richmond, Ind.  
Union Hardware Co., Torrington Ct.  
Winslow, Saml., Skate Mfg. Co., Worcester, Mass.
- Slag Machines.**  
Cambria Iron Co., Johnstown, Pa.
- Slaw Cutters.**  
Tucker & Dorsey Mfg. Co., Indianapolis, Ind.
- Smelting Works.**  
Reeves, Paul S., 760 S. Broad, Phila.
- Soldering Coppers.**  
Clendenin Bros., Baltimore, Md.  
Covert Mfg. Co., West Troy, N. Y.
- Soldering Furnaces.**  
Burgess Soldering Furnace Co., Columbus, Ohio.
- Speaking Tubes.**  
Ostrander, W. R. & Co., 204 Fulton St. N. Y.  
Wollensak, J. F., Chicago, Ill.
- Spelter.**  
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Spoons and Forks.**  
Boardman, L. & Son, New Haddam, Conn.  
Holmes & Edwards Silver Co., Bridgeport, Conn.  
Rogers, The Wm. Mfg. Co., Hartford, Conn.
- Sporting Goods.**  
Hartley & Graham, 313-315 B'way, N. Y.
- Spring Hinges.**  
Bommer Bros., Brooklyn, N. Y.  
Fullman Sash Balance Co., Rochester, N. Y.  
Stover Mfg. Co., Freeport, Ill.  
Van Wagoner & Williams Hdw. Co. 14 Warren St., N. Y.
- Stamping Works.**  
Avery Stamping Co., Cleveland, O.  
Cleveland Stamping & Tool Co., Cleveland, O.
- Staples.**  
Cobb & Drew, Plymouth, Mass.  
Titchener, E.H. & Co., Binghamton, N.Y.
- Steam Gauges.**  
Bristol Co., Waterbury, Conn.
- Steam Hammers, &c., Makers of.**  
Diemel & Eisenhart, Philadelphia.  
Dudgeon, Richard, 24 Columbia Street, N. Y.  
Tretlow Mfg. Co., Pittsburgh, Pa.
- Steam Heating & Oil Separators.**  
Webster, Warren & Co., Camden, N. J.
- Steam Separators.**  
Harrison Safety Boiler Wks., Phila., Pa.  
Webster, Warren & Co., Camden, N. J.
- Steam Specialties.**  
Lukenheimer Co., Cincinnati, O.
- Steel Cold Rolled Strip.**  
Superior Steel Co., Pittsburgh, Pa.  
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel Figures and Alphabet.**  
Krogerud, W., 61 Fulton St., N. Y.
- Steel Importers.**  
Abbott, Wheelock & Co., N. Y. and Boston.  
Hobson, Francis, Seaman & Co., 97 John St., N. Y.  
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.  
Milne, A. & Co., 1 Broadway, N. Y.  
Newton & Shipman, 83 John, N. Y.  
Sherrill Bros., 93 Liberty St., N. Y.  
Whitney, A. B. & Co., Edway, N. Y.  
Wolff, R. H. & Co., Ltd., 118th Street and Harlem River N. Y.
- Steel (Musher's Special).**  
Jones, B. M. & Co., Boston.
- Steel Manufacturers.**  
Atna-Standard Iron & Steel Co., Bridgeport, O.  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Boker, Hermann & Co., 103 Duane St. Carbon Steel Co., Pittsburgh, Pa.  
Chester Steel Castings Co., Phila., Pa.  
Chrome Steel Works, Brooklyn, N. Y.  
Crescent Steel Co., Pittsburgh, Pa.  
Frankford Steel Co., Philadelphia.  
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.  
Hobson, Francis, Seaman & Co., 97 John St., N. Y.  
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.  
Kaiser, Ellison & Co., Sheffield, Eng.  
La Belle Steel Co., Pittsburgh, Pa.  
Lukens Iron & Steel Co., Coatesville, Pa.  
Morehead-McCleane Co., Pittsburgh, Pa.  
Moss, F. W., 83 John, N. Y.  
Pottsville Iron and Steel Co., Pottsville, Pa.  
Bowling, Wm. & Harvey, Frankford, Philadelphia.  
Singer, Nimick & Co., Pittsburgh.  
Superior Steel Co., Pittsburgh, Pa.  
Wordlaw, S. & C., Sheffield, Eng.  
Wetherell Bros., 93 Liberty, N. Y.  
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel, Manufacturers' Agents.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Lindsay, Jas. G. & Co., Phila., Pa.  
Pierson & Co., 29 Broadway, N. Y.
- Steel Rails, Manufacturers of.**  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Cambria Iron Co., Johnstown, Pa.  
Montour Iron Co., Danville, Pa.  
Riverside Iron Wks., Wheeling, W. Va.
- Steel, Tool.**  
Frankford Steel Co., Philadelphia, Pa.  
Jessop, Wm. & Sons, Sheffield, England, 91 John, N. Y.  
Jones, B. M. & Co., Boston, Mass.  
La Belle Steel Co., Pittsburgh, Pa.
- Step Ladders, Rolling.**  
Bicycle Step Ladder Co., Chicago, Ill.  
Cobern Trolley Track Mfg. Co., Holyoke, Mass.  
Croissant, M., Albany, N. Y.
- Stocks and Dies.**  
Armstrong Mfg. Co., Bridgeport, Conn.  
Billings & Spencer Co., Hartford, Conn.  
Butterfield & Co., Derby Line, Vt.  
Hart Mfg. Co., Cleveland, O.  
Oster Mfg. Co., Cleveland, O.  
Saunders' Sons, D., Yonkers, N. Y.  
Wells Bros. & Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Stone Saws and Planers.**  
Lincoln Iron Works, Rutland, Vt.
- Stone Linings.**  
Ostrander Fire Brick Co., Troy, N. Y.
- Stove Pipe Thimbles.**  
Cheney, S. & Son, Manlius, N. Y.
- Stove Trucks.**  
Gwinner Mfg. Co., Hamilton, Ohio.  
Randall & Ward, Le Roy, N. Y.
- Street Lamps.**  
Rochester Lamp Co., 42 Park Place, New York.  
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Structural Iron Work.**  
Lindsay, Jas. G. & Co., Phila., Pa.
- Sulphuric Acid.**  
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Tacks, Brads, Staples, &c.**  
Atlas Tack Corporation, Boston, Mass.  
Chess Bros., Pittsburgh, Pa.  
Clendenin Bros., Baltimore, Md.  
Cobb & Drew, Plymouth, Mass.  
Grand Crossing Tack Co., Grand Crossing, Ill.
- Tack and Nail Machinery.**  
Kimball Bros. & Co., Brockton, Mass.
- Taps and Dies.**  
Butterfield & Co., Derby Line, Vt.  
Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.  
Manning, Maxwell & Moore, 111 Liberty St., N. Y.  
Wells Bros. & Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Telephones.**  
Harrison, W. P. & Co., Columbus, O.
- Testing Laboratories.**  
Riehle Bros. Testing Mach. Co., Philadelphia.
- Testing Machines.**  
Riehle Bros. Testing Mach. Co., Phila.
- Theatrical Hardware.**  
Wollensak, J. F., Chicago, Ill.
- Thill Springs.**  
Frost Thill Spring Co., Boston, Mass.  
Sabin Machine Co., Montpelier, Vt.
- Thrust Collars.**  
Gouverneur Mach. Co., Gouverneur N. Y.
- Time Record.**  
Scattergood, H. W., Phila., Pa.
- Tinning Process.**  
Sands, Thos., Nashua, N. H.
- Tin Plate Machinery.**  
Lloyd Booth Co., Youngstown, Ohio.
- Tire Upsetters.**  
Butts & Ordway, Boston, Mass.
- Toe Calks, Steel.**  
Burke, P. F., Boston, Mass.
- Tool Chests.**  
Am. Tool Co., 200 W. Houston St., N. Y.
- Tool Holders.**  
Armstrong Bros. Tool Co., Chicago, Ill.
- Tools.**  
Brown, R. H. & Co., New Haven, Conn.  
Fray, Jno. S. & Co., Bridgeport, Conn.  
Mayhew, H. H. Co., Shelburne Falls, Mass.  
Millers Falls Co., 93 Reade, N. Y.  
Richardson, C. F. & Son, Athol, Mass.  
Standard Tool Co., Athol, Mass.  
Stanley Rule & Level Co., 29 Chambers, Starrett, L. S., Athol, Mass.  
Stevens, J., Arms & Tool Co., Chicopee Falls, Pa.  
Tower & Lyon, 95 Chambers St., N. Y.
- Tools, Blacksmith and Wheelwright.**  
Buffalo Forge Co., Buffalo, N. Y.  
Butts & Ordway, Boston, Mass.  
Champion Blower & Forge Co., Lancaster, Pa.  
Oster Mfg. Co., Cleveland, Ohio.  
Plumb, Fayette R., Philadelphia, Pa.  
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Tools, Steam and Gas Fitters'.**  
Saunders' Sons, D., Yonkers, N. Y.
- Torches, Oil and Gasoline.**  
Dangler Stove & Mfg. Co., Cleveland, O.  
Schneider & Trenkamp Co., Cleveland, Ohio.
- Transom Lifters.**  
Wollensak, J. F., Chicago, Ill.
- Trucks, Manufacturers of.**  
Clark, G. P., Windsor Locks, Conn.
- Tubes, Seamless Drawn Copper.**  
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.  
Randolph & Clowes, Waterbury, Conn.
- Tubes, Steel.**  
Avery Stamping Co., Cleveland, O.  
Leng's, John S. Son & Co., 4 Fletcher St., New York.  
Shelby Steel Tube Co., Shelby, Ohio.  
U. S. Projectile Co., Brooklyn, N. Y.
- Tumbling Barrels.**  
Henderson Bros., Waterbury, Conn.
- Turnbuckles.**  
Central Iron & Steel Co., Brazil, Ind.  
Cleveland City Forge & Iron Co., Cleveland, O.  
Merrill Bros., Brooklyn, E. D.
- Twist Drills, Makers of.**  
Cleveland Twist Drill Co., Cleveland.  
Morse Twist Drill & Machine Co., New Bedford, Mass.  
New Process Twist Drill Co., Taunton, Mass.  
Standard Tool Co., Cleveland.
- Valves, Gas, Water and Steam.**  
Chapman Valve Mfg. Co., Boston.  
Eynon-Evans Mfg. Co., Philadelphia, Pa.  
Jenkins Bros., 71 John, N. Y.  
Lunkenheimer Co., Cincinnati, O.  
McNab & Harlin Mfg. Co., 56 John, N. Y.
- Ventilating Fans.**  
Huyett & Smith Mfg. Co., Detroit, Mich.
- Ventilator Appliances.**  
Howard & Morse, 45 Fulton St., N. Y.
- Vise Jaws.**  
Newark Mch. Tool Co., Newark, N. J.
- Vises.**  
Hollands Mfg. Co., Erie, Pa.  
Howard Iron Works, Buffalo, N. Y.  
Millers Falls Co., 93 Reade St., N. Y.  
Parker, Chas. Co., Meriden, Conn.  
Prentiss Vise Co., 44 Barclay, N. Y.  
Tower & Lyon, 95 Chambers St., N. Y.
- Wagon Jacks.**  
Covert Mfg. Co., West Troy, N. Y.  
Covert's Saddlery Works, Farmer, N. Y.
- Wagon Poles.**  
Hartzell, Geo. W., Greenville, Ohio.
- Washboards.**  
Olds Wagon Wks., Ft. Wayne, Ind.
- Washers.**  
Haskell, Wm. H. Co., Pawtucket, R. I.  
Milton Mfg. Co., Milton, Pa.  
Newbury, Jay Herbert, Gullerland, N. Y.  
Sternbergh, J. H. & Son, Reading, Pa.
- Washing Machines.**  
Old Wagon Works, Ft. Wayne, Ind.  
Richmond Cedar Wks., Richmond, Va.
- Water Meters.**  
Worthington, Henry R., 86 & 88 Liberty St., N. Y.
- Water Wheels.**  
Poole, Robt. & Son Co., Baltimore, Md.
- Wheelbarrows.**  
Amer. Steel Scraper Co., Sidney, Ohio.  
Bryan Mfg. Co., Bryan, Ohio.  
Sidney Steel Scraper Co., Sidney, O.  
Toledo Wheelbarrow Wks., Toledo, O.  
Withington & Cooley Mfg. Co., Jackson, Mich.
- Wheels.**  
Arnold Metal Wheel Co., New London, Ohio.
- Window Cord, Makers of.**  
Samson Cordage Works, Boston, Mass.
- Wire, Manufacturers of.**  
American Wire Co., Cleveland, Ohio.  
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.  
Miller & Van Winkle, Brooklyn, N. Y.  
New Castle Wire Nail Co., New Castle, Pa.  
New Haven Wire Mfg. Co., New Haven, Conn.  
Prentiss, Geo. W. & Co., Holyoke, Mass.  
Salem Wire Nail Co., Salem, O.  
Trenton Iron Co., Trenton, N. J.  
Washburn & Moen Mfg. Co., Worcester.  
Wetherell Bros., 93 Liberty St., N. Y.  
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.  
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Wire Cloth.**  
Barnum, E. T., Detroit, Mich.  
Clinton Wire Cloth Co., Clinton, Mass.  
Darby, Edward & Sons, Philadelphia.  
Eisey, W. S., 115 Fulton, N. Y.  
Gilbert & Bennett Mfg. Co., 42 Cliff.  
Howard & Morse, 45 Fulton, N. Y.  
Ludlow-Saylor Wire Co., St. Louis, Mo.  
N. J. Wire Cloth Co., Trenton, N. J.  
Scheeler & Sons, Buffalo, N. Y.  
Wickwire Bros., Corland, N. Y.  
Wright & Colton Wire Cloth Co., Worcester, Mass.  
W. S. Tyler Wire Works Co., Cleveland.
- Wire Cutters.**  
King, J. M. & Co., Watertown, N. Y.
- Wire Dies.**  
McFarland, Wm., Trenton, N. J.  
Newton & Shipman, 83 John St., N. Y.
- Wire Fences, See Fencing, Iron and Wire.**
- Wire Goods, Manufacturers of.**  
Bromwell Brush & Wire Goods Co., Cincinnati, Ohio.  
Darby, Edward & Sons, Phila.  
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.  
Ludlow-Saylor Wire Co., St. Louis.  
Ossawan Mills Co., Norwich, Conn.  
Scheeler & Sons, Buffalo, N. Y.  
Wickwire Bros., Corland, N. Y.  
Williamson, C. T., Wire Novelty Co., Newark, N. J.  
Wire Goods Co., Worcester, Mass.
- Wire Machinery.**  
Am. Tool Wks., Cleveland, O.  
Manville, E. J. Mch. Co., Waterbury, Ct.  
Morgan Construction Co., Worcester, Mass.  
Waterbury Mch. Co., Waterbury, Conn.
- Wire Straightening and Cutting Machinery.**  
Add, John & Son, New Haven, Conn.
- Wire Nails.**  
Bond Nail Co., Raynham, Mass.  
Indiana Wire Fence Co., Crawfordville, Ind.  
Kilmer Mfg. Co., Newburg, N. Y.  
New Castle Wire Nail Co., New Castle, Pa.  
Phillips, Townsend & Co., Phila., Pa.  
Salem Wire Nail Co., Salem, O.  
Taunton Wire Nail Co., Taunton, Mass.  
Whitney, A. R. & Co., New York City.
- Wire Rods, Steel.**  
American Wire Co., Cleveland, Ohio.  
New Castle Wire Nail Co., New Castle, Pa.  
Washburn & Moen Mfg. Co., Worcester, Mass.  
Whitney, A. R. & Co., 17 B'way, N. Y.  
Wolff, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Wire Rope, Iron and Steel, Makers.**  
Broderick & Bascom Rope Co., St. Louis, Mo.  
California Wire Works, San Francisco.  
Hazard Mfg. Co., Wilkesbarre, Pa.  
A. Leschen & Sons Rope Co., St. Louis.  
Trenton Iron Co., Trenton, Mass.  
Washburn & Moen Mfg. Co., Worcester, Mass.
- Wire Rope Machinery.**  
Kay, J. F., Passaic, N. J.
- Wire, pool.**  
Malin & Co., Cleveland, O.
- Wood Turning.**  
Cleveland Wood Turning Co., Cleveland, O.
- Wood-Working Machinery.**  
Egan Co., Cincinnati, Ohio.  
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Wrenches, Manufacturers.**  
Bemis & Call Hardware & Tool Co., Springfield, Mass.  
Billings, Spencer & Co., Hartford, Conn.  
Coes Wrench Co., Worcester, Mass.  
Tower & Lyon, 95 Chambers St., N. Y.  
Trimont Mfg. Co., Roxbury, Pa.  
Walworth Mfg. Co., Boston, Mass.
- Wringers.**  
Colby Wringer Co., Montpelier.
- Yacht Hardware.**  
Ferdinand, L. W., & Co. Boston, Mass.



# ALPHABETICAL INDEX TO ADVERTISERS.

Abbott, Wheelock & Co.....	17	Brown, A. & F.....	50	Crawford Mfg. Co.....	78	Goulds Mfg. Co.....	85
Acme Shear Co.....	71	Brown, E. E. & Co.....	95	Crescent Horse Shoe & Iron Co.....	101	Gouverneur Machine Co.....	50
Adt, John & Son.....	40	Brown Hoisting & Conveying Mch.Co.	35	Crescent Mfg. Co.....	8	Graham, John H. & Co.....	87
Atma-Standard Iron & Steel Co.....	19	Brown, R. H. & Co.....	62	Crescent Phosphorized Metal Co....	3	Grand Crossing Tack Co.....	13
Aiken, Henry.....	24	Bryan Mfg. Co.....	104	Crescent Steel Co.....	16	Grand Rapids Cycle Co.....	78
Alexander Bros.....	36	Bryden Horse Shoe Co.....	99	Cresson, Geo. V. Co.....	50	Green, A. H.....	88
Allentown Hdw. Wks.....	23	Buck Bros.....	71	Croissant, M.....	87	Griffith, Axtell & Cady Co.....	63
Allentown Rolling Mills.....	25	Buck, Chas.....	71	Crosby, G. A. & Co.....	39	Gwinner Mfg. Co.....	64
Allis, E. P. Co.....	30	Buckeye Mfg Co.....	29	Crown Smelting Co.....	3	Haight & Clark.....	26
Am. Axe & Tool Co.....	75	Buffalo Forge Co.....	116	Cushman Chuck Co.....	45	Halk & Naumann.....	8
Am. Bolt Co.....	107	Buffalo Scale Co.....	97	Cutter, Wood & Stevens.....	59	Halsey, Jas. T.....	45
Am. Metal Co.....	3	Burden Iron Co.....	99	Dallett, Thos. H. & Co.....	47	Hamilton Machine Tool Co.....	41
Am. Pig Iron & Storage Warrant Co..	18	Burgess Soldering Furnace Co.....	64	Dame, Stoddard & Kendall.....	76	Hammer & Co.....	97
Am. Roll Paper Co.....	76	Burke, P. F.....	101	D'Amour & Littledale.....	39	Hanson & Van Winkle Co.....	27
Am. Screw Co.....	11	Burr & Houston Co.....	22	Dangler Stove & Mfg. Co.....	65	Hardware Board of Trade.....	57
American Specialty Co.....	71	Bussenius & Cunliffe.....	54	Darby, Edw. & Sons.....	8	Harrington, E., Son & Co.....	41
Am. Steel Scraper Co.....	104	Butler, C. N.....	6	Davis, I. B. & Son.....	30	Harrington & King Perforating Co...	9
Am. Tool Co.....	70	Butler Mfg. Co.....	71	Davis, W. P.....	54	Harrington & Richardson Arms Co.	76
American Tool Works.....	54	Butterfield & Co.....	45	Davol, John & Sons.....	2	Harris, Wm. A. Steam Engine Co.....	25
American Wire Co.....	10	Butts & Ordway.....	38	Dean Bros. Steam Pump Works.....	34	Harrison, W. P. & Co.....	80
Ames Sword Co.....	95	Butze, Adolph.....	57	Decatur Shaft Support Co.....	105	Harrison Safety Boiler Wks.....	29
Amidon Tool Corporation.....	70	Byers, Jno. F. Mch. Co.....	57	Deitz, A. E.....	88	Hart Mfg. Co.....	45
Anderson, F. S. & Co.....	103	C. & C. Electric Co.....	27	Deming Co.....	64	Hartford Steam Boiler Insp. and Ins.	27
Ansonia Brass & Copper Co.....	2	Caldwell Mfg. Co.....	95	Detrick & Harvey Machine Co.....	49	Hartley & Graham.....	1
Arcade File Works.....	68	California Wire Works.....	6	Diamond Clamp & Flask Co.....	115	Hartzell, Geo. W.....	97
Arcade Malleable Iron Co.....	21	Cambria Iron Co.....	18&21	Diamond Machine Co.....	51	Haskell, Wm. H. Co.....	108
Arcade Mfg. Co.....	83	Cambridge Iron & Steel Co.....	14	Diamond State Iron Co.....	99	Hazard Mfg. Co.....	6
Armstrong Bros. Tool Co.....	47	Cambridge Roofing Co.....	16	Dienelt & Eisenhardt.....	42	Heinisch's R. Sons Co.....	71
Armstrong Mfg. Co.....	46	Canfield, H. O.....	36	Dietz, Schumacher & Co.....	43&56	Henderer, A. L.....	42
Arnold Metal Wheel Co.....	96	Capewell Horse Nail Co.....	100	Disston, Henry & Sons.....	67	Henderson Bros.....	22
Athol Machine Co.....	65	Carbon Steel Co.....	19	Dixon, Jos., Crucible Co.....	36	Hendey Machine Co.....	60
Atkins, E. C. & Co.....	86	Carlin's Sons, Thomas.....	54	Dodd, A. W. & Co.....	1	Hendricks Bros.....	2
Atlas Mfg. Co.....	116	Carpenter J. M. Tap & Die Co.....	115	Dodge Mfg. Co.....	50	Hendrick Mfg. Co., Ltd.....	7
Atlas Tack Corporation.....	13	Carroll Muzzle Co.....	81	Donaldson Iron Co.....	22	Hendryx, A. B. Co.....	3
Avery Stamping Co.....	73	Cary Mfg. Co.....	83	Douglas, W. & B.....	64	Henley, M. C.....	78&105
Ayer, H. C. & Gleason Co.....	37	Central Iron & Steel Co.....	24	Dow Wire Works Co.....	6	Henry, J. T. Mfg. Co.....	80
Babcock & Wilcox Co.....	33	Chadborne & Coldwell Mfg. Co.....	105	Draper Machine Tool Co.....	54	Herrick, J. A.....	25
Baeder, Adamson & Co.....	62	Chambers Bros. Co.....	108	Dudgeon, Richard.....	43	Herrick & Cowell.....	58
Banker & White.....	69	Champion Blower & Forge Co.....	45	Dunbar Bros.....	4	Hertz, T. & Son.....	3
Banksley, J.....	94	Champion Iron Co.....	7	Dunham Nut Co.....	107	Hill, Clarke & Co.....	55
Barnes, C. K. & Co.....	21	Champion Safety Lock Co.....	96	Dupont Mfg. Co.....	37	Hobson, F., Seaman & Co.....	17
Barnes, W. F. & John.....	38	Chandler & Taylor Co.....	27	Durant, W. N.....	34	Hoffman, C. & A.....	70
Barnett, G. & H.....	69	Chapman Valve Mfg. Co.....	31	Dwight Slate Machine Co.....	38	Hoffman, J. W. & Co.....	16
Barnum, E. T.....	6	Chatillon, John & Sons.....	82	Eagle Bicycle Mfg Co.....	115	Hogan, John L. & Co.....	16
Base Foundry & Machine Works.....	29	Cheney, S. & Son.....	22	East Chicago Foundry Co.....	22	Hoggson & Pettis Mfg. Co.....	45
Bay State Stamping Co.....	51	Chess Bros.....	22	Eccles, Richard.....	96	Hollands Mfg. Co.....	65
Beaman & Smith.....	53	Chester Steel Casting Co.....	23	Egan Co.....	44	Holmes & Edwards Silver Co.....	72
Bement, Miles & Co.....	42	Chicago Fire Arms Co.....	76	Enterprise Mfg. Co. of Pa.....	86	Hooker-Colville Steam Pump Co.....	55
Bemis & Call Hardware & Tool Co....	97	Chicago, Milwaukee & St. Paul R.R..	57	Este, W. S.....	6	Houston, C. B. & Co.....	16
Berger Bros.....	95	Christy Knife Co.....	73	Ette & Henger Mfg. Co.....	104	Howard Iron Works.....	69
Bertsch & Co.....	30	Chrome Steel Works.....	18	Etting, Edw. J.....	16	Howard & Morse.....	7
Bethlehem Iron Co.....	21	Church, Isaac.....	108	Evans-Friction Cone Co.....	3	Howson & Howson.....	6
Bevin Bros. Mfg. Co.....	78	Cincinnati Corrugating Co.....	9	Excelsior Cutlery Co.....	72	Hubbell, Harvey.....	107
Blockford Drill & Tool Co.....	41	Claffen Mfg. Co.....	36	Eynon-Evans Mfg. Co.....	26	Hudson, C. E. & Co.....	88
Bicycle Step Ladder Co.....	86	Clapp, E. D. Mfg. Co.....	96	F. & N. Mfg. Co.....	105	Hutchinson, F. S. Co.....	70
Bigelow, C. R.....	55	Clapp, Geo. M.....	55	Fairmount Machine Co.....	49	Huyett & Smith Mfg. Co.....	39
Bignall & Keeler Mfg. Co.....	42	Clark, G. P.....	105	Fearing, Wm. S.....	2	Ideal Machine Works.....	53
Billings & Spencer Co.....	97	Clark & Cowles.....	5	Ferdinand, L. W. & Co.....	76	Ideal Mfg. Co.....	78
Bingham, W. Co.....	78	Clark Mfg. Co.....	81	Fernald, Geo. H.....	59	Indiana Wire Fence Co.....	7
Birmingham Iron Foundry.....	22	Clarke, Thomas.....	81	Ferracute Machine Co.....	40	Iowa Farming Tool Co.....	102
Bissell, E. Son & Co.....	57	Clauss Shear Co.....	73	Fitch, W. & E. T.....	115	Ives, H. B. & Co.....	94
Black Mfg. Co.....	78	Clendenin Bros.....	13	Fitchburg Machine Works.....	35	Jacobus, W. H.....	108
Blair Mfg. Co.....	104	Cleveland Block Co.....	95	Flagg, Stanley G. & Co.....	116	Jarecki Mfg. Co.....	44
Blair's Husking Gloves.....	106	Cleveland City Forge & Iron Co.....	1	Flint & Co.....	19	Jeffrey Mfg. Co.....	35
Blake & Johnson.....	10	Cleveland Stamping & Tool Co.....	88	Folding Paper Box Co.....	70	Jenkins Bros.....	1
Bliss Co., E. W.....	37	Cleveland Stone Co.....	51	Fralm, E. T.....	95	Jenkins & Lingle.....	38
Boardman, L. & Son.....	71	Cleveland Twist Drill Co.....	47	Frankford Steel Co.....	18	Jenner, H. W. T.....	6
Boker, Hermann & Co.....	17	Cleveland Wood Turning Co.....	81	Franklin, H. H. Mfg. Co.....	55	Jersey City Galvanizing Co.....	14
Boligiano Mfg. Co.....	83	Climax Mfg. Co.....	80	Fray, Jno. S. & Co.....	80	Jessop, Wm. & Sons.....	17
Bommer Bros.....	116	Clinton Wire Cloth Co.....	8	Frost Thill Spring Co.....	101	Johnson, I. H., Jr., & Co.....	48
Bond Nail Co.....	10	Cobb & Drew.....	7	Fulton Iron & Engine Works.....	48	Jones, B. M. & Co.....	19
Boone, W. C. Mfg. Co.....	23	Coburn Trolley Track Mfg. Co.....	89	Gardner, Jas. & Son.....	26	Jones, Jesse & Co.....	69
Booth, The Lloyd Co.....	26	Coes, Loring & Co.....	102	Garland Chain Co.....	15	Jones & Lamson Machine Co.....	60
Borden & Lovell.....	10	Coes Wrench Co.....	102	Garrison, A., Foundry Co.....	19	Kay, J. F.....	4
Borgner, Cyrus.....	26	Coffin & Leighton.....	45	Garry Iron Roofing Co.....	80	Kayser, Ellison & Co.....	17
Boston Casting Co.....	3	Colled Wire Belting Co.....	95	Garland Foundry Co.....	19	Keeley, Jerome & Co.....	76
Boston Gear Works.....	29	Colburn, A. M.....	45	Garvin Machine Co.....	55	Keene Mfg. Co.....	18
Box, Alfred & Co.....	51	Colburn Electric Mfg. Co.....	27	Gautier Steel Department.....	14	Kennedy, Julian.....	24
Bradlee & Co.....	15	Colby Wringer Co.....	82	Gay & Parsons.....	81	Keys, W. W. & R. M. Co.....	3
Bradley Fertilizer Co.....	41	Coldwell Lawn Mower Co.....	108	Gaylord, F. L. Co.....	3	Keystone Clutch & Machine Works..	45
Brass Goods Mfg. Co.....	2	Coleman, J. A.....	56	Gibbs Mfg. Co.....	105	Kilmer Mfg. Co.....	7
Bridgeport Deoxidized Bronze & Metal Co.....	3	Columbian Novelty Co.....	57&78	Gilbert & Bennett Mfg. Co.....	8	Kimball Bros. & Co.....	10
Bridgeport Gun Implement Co.....	78	Columbian Sash & Door Lock Co.....	91	Glenon Tool Co.....	26	King & Andrews.....	59
Bridgeport Mch. Tool Works.....	53	Conroy, P. J. & Co.....	82	Goddard, Asa.....	38	King, J. M. & Co.....	69
Briggs, Marvin.....	55	Continental Iron Works.....	29	Goodell, J. W. Co.....	78	Kehler, F. B. & Co.....	105
Bristol Co.....	1	Corning, Edw. & Co.....	15	Gould & Eberhardt.....	35		
Britton, J. Blodgett.....	23	Correspondence School of Mechanics.	61				
Broderick & Bascom Rope Co.....	6	Cotton, Barclay W. & Co.....	15				
Bromwell Brush & Wire Goods Co....	86	Covett Mfg. Co.....	102				
Bronson Supply Co.....	82	Covett's Saddlery Works.....	61				
		Cox, Justice Jr.....	16				
		Cramp, Wm. & Sons S. & E. B. Co....	3				

Kreischer, B. & Sons.....	26	New Haven Mfg. Co.....	42	Richmond Cedar Works.....	87	Taunton Locomotive Mfg. Co.....	31
Krogsrud, W.....	97	New Haven Wire Mfg. Co.....	6	Ridgway, Craig & Son.....	48	Taunton Wire Nail Co.....	10
La Belle Steel Co.....	20	N. J. Wire Cloth Co.....	8	Riehle Bros. Testing Machine Co.....	35	Taylor & Boggis Foundry Co.....	19
Lafin & Rand Powder Co.....	22	New Process Twist Drill Co.....	47	Riverside Iron Works.....	19	Thomson, W. H. & Co.....	16
Lane Brothers.....	95	Newton, G. J. & Co.....	56	Roberts, A. & P. & Co.....	18	Tiebout, W. & J.....	94
Lane & Bodley Co.....	40	Newton & Shipman.....	17	Roberts Mfg. Co.....	35	Titchener, E. H. & Co.....	13
Laughlin, Alex. & Co.....	24	N. Y. Belting & Packing Co.....	36	Robinson-Rea Mfg. Co.....	23	Tod, Wm. & Co.....	29
Lay, Jos. & Co.....	85	N. Y. Powder Co.....	22	Rochester Lamp Co.....	82	Toledo Wheelbarrow Works.....	103
Lee, J. Tatnall & Co.....	20	N. Y. Iron Roofing & Corrugating Co.....	9	Rogers, The Wm. Mfg. Co.....	72	Toomey, Frank.....	55
Lean, D. R. Co.....	25	Nichols Bros.....	73	Rome Brass & Copper Co.....	2	Torrance Iron Co.....	24
League Cycle Co.....	115	Nicholson File Co.....	69	Rowland, Wm. & Harvey.....	116	Totten & Hogg Iron and Steel Fdry. Co.....	22 & 33
Le Count, C. W.....	101	Nicolls, Wheeler & Co.....	17	Russell, Burdall & Ward.....	116	Tower & Lyon.....	79
Leechburg Foundry & Machine Co.....	22	Niles Tool Works.....	56	Russell & Erwin Mfg. Co.....	90	Townsend, W. P. & Co.....	106
Leag's, Jno. S. Son & Co.....	116	North Bros. Mfg. Co.....	18&61	Russia Cement Co.....	63	Tracy, A. J. Co., Ltd.....	78
Leonard, B. E.....	102	Northampton Cutlery Co.....	72	Sabin Machine Co.....	5	Trenton Iron Co.....	4
Leonard, J.....	21	Northampton Emery Wheel Co.....	51	Salem Wire Nail Co.....	10	Trethewey Mfg. Co.....	24
Leschen, A. & Sons Rope Co.....	6	Norton Bros.....	96	Samson Cordage Works.....	1	Trimont Mfg. Co.....	97
Levis, Henry & Co.....	21	Norton Emery Wheel Co.....	51	Samuel, Frank.....	15	Tuck Mfg. Co.....	5
Lidgerwood Mfg. Co.....	116	Norwalk Iron Works Co.....	34	Saunders, Thomas.....	59	Tucker & Dorsey Mfg. Co.....	88
Lincoln Iron Works.....	41	Obermayer, S. Co.....	21	Saunders's Sons, D.....	43	Tudor Iron Works.....	1
Lindsay, Jas. G. & Co.....	18	Ogden & Wallace.....	21	Scattergood, H. W.....	53	Tyler Wire Works Co. W. S.....	60
Link-Belt Engineering Co.....	38	Old Dominion Iron & Nail Works Co.....	9	Scheeler & Sons.....	9	Union Hardware Co.....	79
Lockhart Iron & Steel Co.....	17	Olds Wagon Works.....	85	Schneider & Trenkamp Co.....	88	Union Mfg. Co.....	46
Long & Allstatter Co.....	40	Ossawan Mills Co.....	115	Scott, Geo. M.....	46	Union Metallic Cartridge Co.....	1
Lovell, Jno. P. Arms Co.....	116	Oster Mfg. Co.....	46	Scoville Mfg. Co.....	2	Union Show Case Co.....	70
Lucas, C. O. & Co.....	80	Ostrander Fire Brick Co.....	26	Scranton & Co.....	38	U. S. Projectile Co.....	43
Ludlow-Saylor Wire Co.....	7	Ostrander, W. R. & Co.....	63	Scranton Forging Co.....	99	Valentine, M. D. & Bro. Co.....	26
Lukens Iron & Steel Co.....	15	Otto Gas Engine Works.....	32	Scranton Supply & Machine Co.....	54	Valley Pump Co.....	33
Lundberg, Gustaf.....	18	Palmers & De Mooy Fdry. Co.....	23	Seaman, Sleeth & Black.....	22	Van Dorn Iron Works Co.....	7
Lunkenheimer Co.....	28	Palmer Hardware Mfg. Co.....	62	Sebastian Lathe Co.....	48	Van Wagoner & Williams Hdw. Co.....	116
McCabe, J. J.....	54	Pancoast, Henry B. & Co.....	44	Selbert, J. M.....	46	Variety Machine Co.....	50
McCaffrey File Co.....	69	Parker, Chas. Co.....	86	Sellers, Wm. & Co.....	49	Vulcan Iron Works.....	26
McCallip Fence & Wire Works.....	9	Passaic Rolling Mill Co.....	21	Seneca Falls Mfg. Co.....	48 & 66	Waddell Wooden Ware Wks.....	84
McClure & Amsler.....	25	Peck, A. G. & Co.....	116	Sessions Foundry Co.....	23	Wals & Roos Punch & Shear Co.....	38
McCoy, Jos. F. & Co.....	81	Peerless Mfg. Co.....	85	Seyfert's Sons, L. F.....	54	Walker Mfg. Co.....	25
McFarland, Wm.....	4	Pennsylvania Bolt & Nut Co.....	106	Sharon Clay Mfg. Co.....	23	Wallace Wm. H. & Co.....	21
McGowan, J. H. & Co.....	34	Penna. Elevator Engineering Co.....	48	Shelby Steel Tube Co.....	22	Walworth Mfg. Co.....	115
McIlvain, Wm. & Sons.....	25	Penn Iron Roofing & Corrugating Co.....	14	Shepard, Sidney & Co.....	83	Wardlow, S. & C.....	17
McKay, Jas. & Co.....	15	Pennsylvania Mch. Co.....	54	Sherwood Mfg. Co.....	35	Warner Elevator Mfg. Co.....	48
McKinney Mfg. Co.....	94	Perry, W. H. & Co.....	56	Shoenberger & Co.....	98	Washburn & Moen Mfg. Co.....	4
McLean, John.....	29	Perry & Whipple Co.....	96	Shultz Belting Co.....	1	Waterbury Brass Co.....	2
McNab & Harlin Mfg. Co.....	29	Peters Pump Co.....	66	Sickels, Sweet & Lyon.....	74	Waterbury Farrel Foundry & Ma- chine Co.....	34
Machinists' Supply Co.....	55	Philadelphia Engineering Wks.....	25	Sidney Steel Scraper Co.....	104	Waterbury Machine Co.....	44
Mahoning Valley Iron Co.....	21	Phillips, Townsend & Co.....	13	Sigourney Tool Co.....	40	Watson & Stillman.....	43
Main Belting Co.....	36	Phoenix Horseshoe Co.....	99	"Silver Finish".....	13	Webster, Warren & Co.....	28
Malin & Co.....	101	Phoenix Iron Co.....	15	Silver Mfg. Co.....	41	Wells Bros. & Co.....	46
Mann, Jas. & Sons.....	94	Phosphor Bronze Smelting Co.....	3	Simonds Mfg. Co.....	66	Wells, Heber.....	53
Manning, Maxwell & Moore.....	47	Pierson & Co.....	18	Singer, Nimick & Co.....	20	Wetherell Bros.....	17 & 20
Manville Machine Co., E. J.....	53	Pike Mfg. Co.....	77	Skinner Chuck Co.....	45	Wetherhill, Robt. & Co.....	115
Maris & Beekley.....	49	Pilling & Crane.....	16	Smith & Egge Mfg. Co.....	94	White, A. A. & Co.....	69
Maclin, J. & Son.....	34	Piqua Handle & Mfg. Co.....	68	Smith, H. D. & Co.....	101	White, L. & I. J. Co.....	71
Massey & Thompson.....	70	Pittsburgh I. & S. Eng. Co.....	25	Smith, J. D. Foundry Supply Co.....	23	White Mt. Freezer Co.....	61
Matthiessen & Hegeler Zinc Co.....	2	Pittsburgh Mfg. Co.....	36	Smith's Pattern Works.....	24	White, Van Gahn & Co.....	70
Maurer, H. & Son.....	26	Pittsburgh Reduction Co.....	60	Smythe, S. R. Co., Inc.....	24	Whiting Foundry Equipment Co.....	25
Mayhew, H. H. Co.....	75	Place, Geo.....	54	Sommer's Son, John.....	116	Whitlock, Wm.....	45
Merrill Bros.....	2	Plumb, Fayette R.....	73	Southwark Foundry & Machine Co.....	28	Whitlock Coil Pipe Co.....	31
Merrill Mfg. Co.....	43	Plume & Atwood Mfg. Co.....	2	South, W. A. Co.....	82	Whitney, A. R. & Co.....	18
Merriman, A. H.....	39	Pollock, W. B. & Co.....	29	Spedel & Roeper.....	49	Whitton, D. E. Mch. Co.....	45
Meyers, Fred J. Mfg. Co.....	84	Poole, Robt. & Son Co.....	33	Spencer's I. S. Sons.....	26	Wickwire Bros.....	7
Miles, F. S.....	105	Pope Mfg. Co.....	61	Springfield Gas Engine Co.....	27	Wickox & Howe Co.....	101
Miller, C. & Son.....	65	Popping, J.....	63	Standard Fdry. & Mfg. Co.....	20	Wiley & Russell Mfg. Co.....	44 & 116
Miller & Van Winkle.....	116	Port Chester Bolt & Nut Co.....	107	Standard Horse Shoe Co.....	99	Williamson, C. T. Wire Nov. Co.....	84
Millers Falls Co.....	62 & 116	Porter, H. K.....	107	Standard Tool Co.....	47	Wilmot & Hobbs Mfg. Co.....	1
Milne, A. & Co.....	18	Portland Lawn Sprinkler Co.....	105	Stanley Rule & Level Co.....	115	Wilson, E. H. & Co.....	18
Milton Mfg. Co.....	108	Pottstown Iron Co.....	18	Stanley Works.....	93	Wilson, John.....	70
Miner & Peck Mfg. Co.....	42	Pottsville Iron & Steel Co.....	15	Stark Mch. & Tool Co.....	38	Wilson, J. Fred.....	108
Mohr, J. J.....	18	Powell Planer Co.....	42	Starrett, L. S.....	65	Wilson, W. A.....	42
Monce, S. G.....	64	Pratt & Cady Co.....	115	Steam Gauge & Lantern Co.....	82	Winslow, Sam'l. Skate Mfg. Co.....	74
Montour Iron & Steel Co.....	21	Prentiss, Geo. W. & Co.....	7	Stearns, E. C. & Co.....	60	Wire Fence Supply Co.....	4
Moore, Dr. Gideon E.....	60	Prentiss Tool & Supply Co.....	54	Steptoe, J. & Co.....	56	Wire Goods Co.....	5
Moore Mfg. & Foundry Co.....	49	Prentiss Vise Co.....	64	Sterling Emery Wheel Co.....	51	Wister, Francis.....	16
Moore & White Co.....	50	Pullman Sash Balance Co.....	71	Sternbergh, J. H. & Son.....	107	Wister, L. & R. & Co.....	21
Moorhead-McCleane Co.....	20	Putnam Nail Co.....	100	Stevens, J. Arms & Tool Co.....	68	Withington & Cooley Mfg. Co.....	103
Morgan Construction Co.....	4	Quint, A. D.....	41	Steward & Romaine Mfg. Co., Ltd.....	107	Wohler Aluminum Co.....	83
Morgan Spring Co.....	4	Rainey, W. J.....	1	Stiles & Parker Press Co.....	37	Wolf, W. & L.....	95
Morrison, Robert.....	26	Randall & Ward.....	62	Stirling Co.....	32	Wolf, R. H. & Co. Ltd.....	9
Morse Twist Drill & Machine Co.....	47	Randolph & Clowes.....	1	Stocking, E. B.....	6	Wollensak, J. F.....	62, 65 & 96
Morse, Williams & Co.....	49	Ranson Hardware Co.....	61	Storm Mfg. Co.....	63	Wood Alan & Co.....	16
Morton, Thos.....	97	Reading Hardware Co.....	63	Stover Mfg. Co.....	95	Wood, R. D. & Co.....	23
Moseley Iron Bridge & Roof Co.....	13	Red Jacket Mfg. Co.....	65	Stow Flexible Shaft Co.....	47	Wood, W. Dewees Co.....	20
Mount Carmel Bolt Co.....	115	Reeves, Paul S.....	110	Stow Mfg. Co.....	47	Woodward & Rogers.....	40
Myers, F. E. & Bro.....	64	Reeves Pulley Co.....	60	Streeter, N. R. & Co.....	81	Wooster, F. V.....	80 & 96
National Horse Nail Co.....	101	Republic Press.....	33	Sturtevant, B. F. Co.....	42	Worcester Mch. Screw Co.....	108
National Pipe Bending Co.....	32	Reynolds & Co.....	12	Superior Steel Co.....	5	Worthington, Henry R.....	24
National Saw Co.....	68	R.I. Perkins Horse Shoe Co.....	99	Supplee Hardware Co.....	105	Wright & Colton Wire Cloth Co.....	8
Newark Machine Tool Works.....	60	Rhode Island Tool Co.....	1	Sweetser, W. A.....	21	Wrightsville Hardware Co.....	61
Newbury, Jay H.....	97	Rhodes, L. E. Co.....	53	Swindell, W. & Bros.....	23	Wurster, F. W. & Co.....	116
New Britain Hardware Mfg. Co.....	94	Rice Mfg. Co.....	25	Syracuse Twist Drill Co.....	75	Wyman & Gordon.....	97
New Castle Wire Nail Co.....	10	Richardson, C. F. & Son.....	26	Tablet & Ticket Co.....	53	Yale & Towne Mfg. Co.....	48 & 63
New England Screw Co.....	107	Richards, I. P.....	115	Taintor Mfg. Co.....	65	Zucker & Levett & Loeb Co.....	26
New Haven Copper Co.....	2			Talcott, W. O.....	84		
				Tanite Co.....	116		

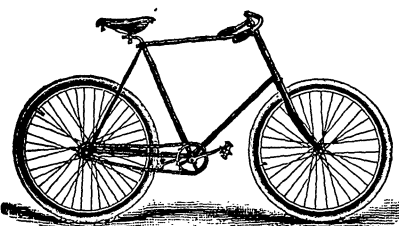
Published by DAVID WILLIAMS, 96-102  
Reade Street, New York. Printed by  
THE WILLIAMS PRINTING CO., Gen-  
eral Book, Commercial and New-  
paper Printers and Binders, 96-102  
Reade St., New York.





**WHEN IN NEED** Address **MOUNT CARMEL BOLT CO.,**  
MOUNT CARMEL, CONN.

## OUR AGENTS MAKE MONEY.



We Make  
Wheels to Sell and  
Stay Sold.

**THE EAGLE BICYCLE MFG. CO.,**  
TORRINGTON, CONN.

FIRST AND ONLY  
IN THE WORLD TO MAKE

## ALUMINUM RIMS AND CLINCHER TIRES.

**THE PRATT & CADY CO.,**

—MANUFACTURERS OF—

## IRON, BRASS COMPOSITION AND BRONZE CASTINGS

Special facilities enable us to execute orders promptly. Prices reasonable for high grade work.

**WILLIAM A. HARRIS, SELLING AGENT,** - **HARTFORD, CONN.**

### *Metal Worker Pattern Book.*

A Practical Treatise on the Art and Science of Pattern Cutting as Applied to Sheet Metal Work. Seventh edition. Illustrated with 520 line engravings. 242 pages, 12½ x 10 inches. Printed on heavy paper. Substantially bound in cloth.....\$5.00

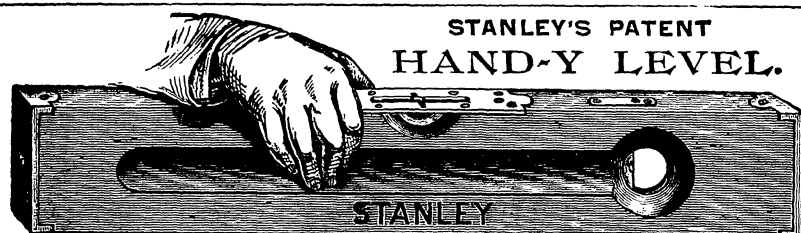
**ITS PRINCIPAL CONTENTS** are as follows: 1. *Definitions and Technicalities.* 2. *Drawing Tools and Materials.* 3. *Geometrical Problems.* 4. *Art and Science of Pattern Cutting.* 5. *Pattern Problems.* Each demonstration is complete in itself. The list of problems embraces almost everything of common occurrence in the sheet-metal trades. The tinner will find in this book what he requires without the necessity of studying the cornice problems. The cornice maker will find everything—from a simple miter to the most complex problems—so arranged as to meet his requirements without having to go over portions in which he is not interested. The apprentice and student will find the entire subject presented in such a manner as will facilitate systematic study. A carefully prepared index accompanies the work.

Sent, post-paid, on receipt of price by **DAVID WILLIAMS,**  
Publisher and Bookseller, 96-102 Reade Street, New York.

**WALWORTH MFG. CO., Boston, Mass.**  
**STEAM, WATER AND GAS GOODS IN ENDLESS VARIETY**  
—SEND FOR CATALOGUE.—

## PLUMBERS' AND FITTERS' TOOLS AND SUPPLIES.

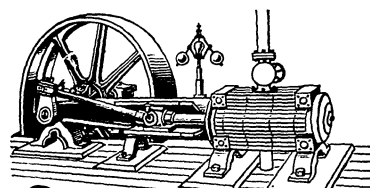
Tools for cutting and threading Wrought Iron Pipe, Die Plates and Dies, Stillson Pipe Wrench, Miller's Ratchet Die Plate, Brass and Iron Valves and Cocks, Wrought Iron Pipe and general Machinists' Supplies.



The shallow grooves along the two sides of this Level give the owner an excellent grip on the Tool. In climbing ladders, walking on stagings or on the frame of a building, the peculiar form of the Level imparts a feeling of steadiness to the workman who carries it. For ascertaining a Plumb, it can be brought to a perpendicular position with remarkable ease and accuracy.

No. 16. Hand-y Plumb and Level, Cherry, Polished and Tipped.....\$1.25

Manufactured by **THE STANLEY RULE & LEVEL CO. New Britain, Conn.**  
SOLD BY ALL HARDWARE DEALERS.



**CORLISS ENGINES**  
**MACHINISTS**  
IRON FOUNDERS, BOILER MAKERS.  
**ROBT. WETHERILL & CO.**  
CHESTER, PA.

ALL SIZES  
½ in. to 4 in. diam.



For Punching  
IRON AND STEEL.

## VENTILATION.

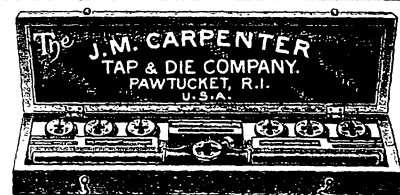
A Text-Book to the practice of the art of ventilating buildings. With a supplementary chapter upon Air Testing by **WM. PATON BUCHAN, R. P.** 175 illustrations, 226 pages, price \$1.40. Sent, post-paid, on receipt of price by

**DAVID WILLIAMS, Publisher & Bookseller,**  
96-102 Reade Street, New York



**OSSAWAN MILLS CO.,**  
Norwich, Conn., U. S. A.

HEADQUARTERS FOR  
Bright Wire Goods, Picture  
Wire, Nails, Knobs and Hooks,  
Brass Chain, Spool Wire, etc.  
Crown and Giant Braided  
Sash Cord, Masons' and Clothes  
Lines.



### A SATISFIED CUSTOMER

is the best advertisement. This is the way they talk when asked how they like



### THE LEAGUE CHAINLESS

after a 40-mile ride over hills and muddy roads: "If I was buying 50 bicycles 49 of them would be the League Chainless, and the 50th a chain machine for a relief." This simply voices the opinions of thousands of others who have ridden the League Chainless. **THE LEAGUE CYCLE CO., Hartford, Ct.**

**THE W. & E. T. FITCH CO.,**  
NEW HAVEN, CONN.  
Manufacturers of a variety of  
**HARNESS SNAPS.**



This Cut represents the  
**UNION PAT. BOLT SNAP.**

**PAUL S. REEVES,**  
Philadelphia.  
**Phosphor Bronze**  
AND  
**BABBITT METALS.**  
Lead Lined Car Bearings a Specialty.

Brass and Phosphor Bronze Castings from ¼ pound to 20,000 pounds in weight.

**BUFFALO SHAVING EXHAUSTERS.**  
FOR HANDLING REFUSE IN ALL WOOD WORKING INDUSTRIES  
BUFFALO FORGE CO. BUFFALO, N.Y. U.S.A.

PROGRESSIVE AND APARTMENT TYPES  
**BUFFALO LUMBER DRY KILNS.**  
BUFFALO FORGE CO. BUFFALO, N.Y. U.S.A.

THE DIAMOND BRASS DOWEL PIN AND WOOD FILLET.  
THE D.C. & F. CO.  
BUFFALO, N.Y. U.S.A.

**STEEL TUBES**  
WELDLESS  
JOHN S. LENG'S SON & CO. NEW YORK.

**EMERY,** Emery Wheels, Grinding Machines, Grinders, Supplies. Quick process and large stock. When in a hurry order of

**THE TANITE CO.,**  
Stroudsburg, Monroe Co., Pa., U. S. A.  
New York, 161 Washington Street.  
Cincinnati, 1 West Pearl Street.  
London, Eng., Thos. Hamilton, 90 Cannon St., E. C.

**MILLER & VAN WINKLE**  
**STEEL WIRE AND STEEL SPRINGS**  
TEMPERED STEEL WIRE  
TEMPERED COMPRESSION & EXTENSION SPRINGS  
A SPECIALTY  
MACHINERY SPRINGS  
OFFICE & WORKS 18 to 24 BRIDGE ST. BROOKLYN, N.Y.

The Iron Age Hardware Price Book E.  
WITH MULTIPLE INDEX.  
7 x 10 inches, 350 pages, flexible seal grain leather, with pocket; Crane's heavy ledger paper, \$5.00.

Sent postpaid upon receipt of price.  
DAVID WILLIAMS, 98-102 Reade St., New York

**BOMMER** COMPOUND SPIRAL Spring  
**HINGES**  
Are the Best.  
Utility, Durability and Beauty Combined.  
IT PAYS TO SELL THEM.  
BOMMER BROS.,  
351 & 353 Jay St., Brooklyn, N. Y.

**STANLEY G. FLAGG & CO.,** Philadelphia, Pa.  
Office and Works, N. W. Cor. 19th St. & Pennsylvania Ave.  
Manufacturers of **STEEL CASTINGS,**  
A Substitute for Steel and Wrought Forgings.  
Circulars Sent on Application.

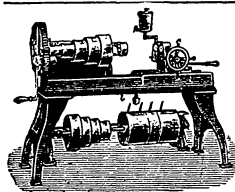
**HAND DRILL.**

**See Page 62.**

**MILLERS FALLS CO.,**  
93 Reade St., New York.

**EUREKA CAST STEEL COMPANY.**  
Office and Works, Chester, Pa.  
Open Hearth, Crucible and Eureka Steel Castings.  
Railroad and Machine Castings.  
Locomotive Cross-Heads and Gearing a Specialty.  
Guaranteed Knuckles for M. C. B. Couplers.

**SPRINGS AND AXLES**  
ROLLING MILL.  
**F. W. WURSTER & CO.**  
375 Kent Ave. Brooklyn N.Y.



No. 48 Green River Bolt Cutting, Nut-Tapping and Pipe Threading Machine, for Power or Hand use.  
MADE BY  
**WILEY & RUSSELL MFG. CO.,**  
Greenfield, Mass.  
Send for New Catalogue.

**LIDGERWOOD**  
**HOISTING ENGINES.**  
300 styles and sizes. Over 10,000 in use.  
**LIDGERWOOD MFG. CO.,** 96 Liberty St., N. Y.

ESTABLISHED  
Spring Making, 1842. Steel Making, 1845.  
Norway Iron, 1871 (Re-Rolled).

**WM. & HARVEY ROWLAND,**  
MANUFACTURERS OF  
**Springs, Steel, Re-Rolled Norway**  
**Iron & Slit Norway Nail Rods.**

Address FRANKFORD P. O., PHILADELPHIA.



**A. G. PECK & CO.**  
Cohoes, N. Y.  
MANUFACTURERS OF  
**AXES, ADZES, BROAD AXES, HATCHETS.**

Send for Catalogue and Price List.

**THIS IS THE TIME TO BUY**  
**MALLETS and BUNG**  
**STARTERS.**

WRITE FOR PRICES TO  
**JOHN SOMMER'S SON,**  
355-365 Central Ave., Newark, N. J.

**RUSSELL, BURDSALL & WARD,**  
Portchester, N. Y.,  
Manufacturers of  
Carriage, Tire, Plow and Stove  
**BOLTS**

Carriage Bolts made from Best Square Iron a Specialty.



**More Artistic**  
than cast iron; better; stronger  
**BRADLEY STEEL SHELF BRACKET.**  
Sells at a lower price. Pays a larger profit. Send for circular.

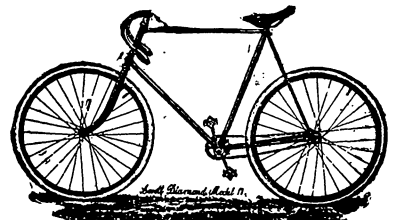
**Atlas Mfg. Co.,**  
New Haven, Ct.

PAT. NOV. 3, 1882.

**WANTED**

Wide-awake agents to sell the most popular, largest seller and best **BICYCLE** made,

**THE LOVELL DIAMOND.**



Liberal terms. Send for Catalogue and Prices.

**LATEST AND BEST,**  
**JOHNSON**  
**AUTOMATIC REVOLVER.**



Send for our new catalogue of specialties.

**JOHN P. LOVELL ARMS CO.,**  
Manufacturers and Jobbers in  
Fire Arms, Bicycles and Sporting Goods,  
**BOSTON, MASS.**

		JAPANNED.	
		Length of Flanges.	Double Acting.
FOR DOORS,			
Feet.	Inch.		
6x2	¾ to 1 ½	3 ½ in	63
7x2	1 to 1 ¾	4 in	64
7x2 ½	1 to 1 ¾	5 in	65
7x2 ½	1 to 1 ¾	6 in	66
8x2 ½	1 ¼ to 1 ¾	7 in	67
8x3	1 ½ to 2 ¼	8 in	68
9x3	1 ¾ to 2 ½	10 in	69

FOR SCREEN, MEDIUM AND HEAVY DOORS.

**Single and Double Acting.**

**THE 3 ½ AND 4 INCH**  
**ARE THE BEST IN**  
**THE MARKET FOR**  
**SCREEN DOORS.**



Send for full Catalogue of Bronzed, Brass and Bronze Metal Spring Hinges.

MANUFACTURED BY

**Van Wagoner & Williams Hardware Co.,**  
CLEVELAND, O., and 14 WARREN ST., N. Y.

# THE IRON AGE

THURSDAY, SEPTEMBER 6, 1894.

## Coking with Recovery of By-Products.

During the past year a number of the most progressive metallurgists and engineers of the United States have become keenly interested in the phenomenal work, from a business point of view, done in Germany in the recovery of by-products in coke manufacture. Some of the leading iron and steel concerns have been led to investigate it through men connected with their establishments. Earnest work has been done, and the matter has now progressed

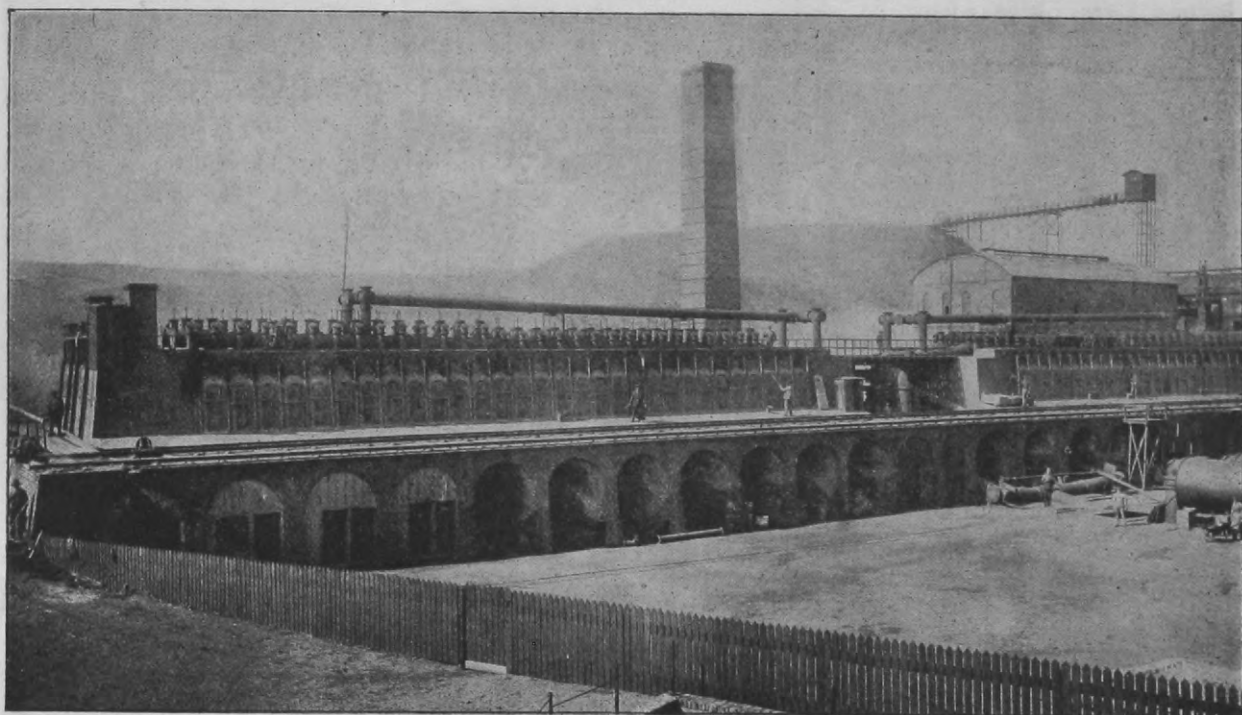
upon practically the whole of the country. If coal does not coke in the antediluvian beehive oven, it is unfit for coking. Unless the coke has the particular characteristics of the Connellsville product it is bad practice to charge it into the blast furnace. But even though it be true that Connellsville coke is the *beau ideal* of furnace fuel, it does not by any means follow that coke not possessing its special features is not technically a good fuel, and may not in many localities be commercially a much better article.

American coke makers and blast furnacemen have been strangely conservative in this matter, and have failed to

Pittsburgh during a visit to the Continent two years since. This spring Mr. Wilcox spent nearly two months in a special investigation, and collected a mass of material which exceptional facilities made particularly valuable. We are indebted to him for many additional data which we are in a position to place before the American iron trade.

### The Retort Coking Ovens.

All the different systems producing coke by the so-called retort, or Belgian ovens, make use of rectangular fire brick chambers, varying in length from 25 to 35 feet; in width from 14 to 22



THE OTTO-HOFFMAN COKE OVEN PLANT AT RECKLINGHAUSEN II. COLLIERY.

to the point that arrangements for the erection of plants have been completed, and that soon the new industry will be planted on American soil. We have before expressed the opinion, which a closer investigation has strengthened, that there is no direction in which so promising an opportunity exists to secure a marked lowering in the cost of production of iron and steel in this country, and that those who are pioneers in it will reap the rewards which the introduction of economies entitle them to.

American coke manufacturers have been under the spell of the Connellsville region. It is the standard fuel of our blast furnaces. The region has had the advantage above all of cheap mining, proximity to great markets, and of a quality of coal which yielded by the crudest methods a product of excellent character. Its pre-eminence has been such that it has imposed its practice

appreciate what is being done abroad. If it is true, as some assert who have the credit of being very careful and far sighted students of our iron industry, that before another decade has passed we shall be competitors of European makers in the world's markets, then we must now prepare for the contest by introducing every economy.

We have naturally been driven to labor saving appliances until we are in advance of all others in that direction. But we have undoubtedly been very wasteful of fuel, and with our enormous coal resources have entirely neglected those of medium quality. We believe that when once introduced and thoroughly understood, the closed ovens will make it possible to produce satisfactory coke from fuels very much nearer to some of our producing centers.

The importance of the subject impressed itself upon John F. Wilcox of

inches, and in height from 4 feet 6 inches to 5 feet 8 inches. The coal is in all cases charged into the oven through two or more circular openings. The general difference in the several systems is in the arrangement of the flues for the combustion of gases which are used in heating the retorts, and in the regulation of the admission of air for the proper combustion of gases. A number of different ovens are in use, among them being the Otto-Hoffman, which is arranged for the recovery of by-products; the Otto Coppee, without condensation apparatus; the Semet-Solvay, the Carves Seibel, Carves-Simon, Carves Huessener and Bernard. Some statistics may be presented to show how extensive has been the introduction of the different systems. Dr. C. Otto & Co. of Dahlhausen a. d. Ruhr, Germany, who control the Otto-Coppee, without recovery of by-products, and the Otto-Hoffman, with re-



covery, have built the following plants up to the middle of this year:

Year.	Otto-Hoffman (with recovery).	Otto-Coppee (without recovery).
1876.....	.....	60
1878.....	.....	276
1879.....	.....	166
1880.....	.....	340
1881.....	10	262
1882.....	.....	674
1883.....	20	642
1884.....	180	346
1885.....	230	220
1886.....	60	320
1887.....	120	370
1888.....	80	552
1889.....	320	460
1890.....	370	484
1891.....	10	230
1892.....	40	401
1893.....	27	396
1894 to July 1.....	292	180
Total.....	1,759	6,309
Special types.....	96	....

Of these there are 776 Otto-Hoffman and 5911 Otto-Coppee ovens in the

There are a number of modifications of the Carves oven, which are distinguished, coupling with that name the engineer who designed the modification. The *Journal de l'Eclairage au Gaz* of July 5, 1893, publishes the following figures concerning the Carves-Seibel ovens in France:

	Ovens.
Tamaris (Gard).....	35
Bessegès (Gard).....	50
Terrenoire (Loire).....	50
Cransac (Aveyron).....	25
Total.....	160

Detailed statistics are not available concerning the Simon-Carves oven. It is claimed, however, that there are about 400 ovens in operation. Of the Carves Huessener ovens there are 100 in operation at Bulmke, near Geleenkirchen, Westphalia. These figures clearly show how over-

near as possible to the regenerator without actually infringing on the Otto patent. If it is desired to erect ovens without the saving of the by-products, the Otto-Coppee ovens are recommended. They are simple of construction and durable. They are carefully worked up as to details and their system for the combustion of gases and the mixture of air is a fine one. Mr. Wilcox reports that he has seen these ovens work on all kinds of coal and giving satisfaction, and has been informed by all the blast furnace managers at the furnaces visited that after years of constant work the repairs have been nominal, and that after careful consideration of the different systems they adopted that of Otto & Co. as being the best, and have had no reason to regret their decision. The Otto oven has shown great durability,

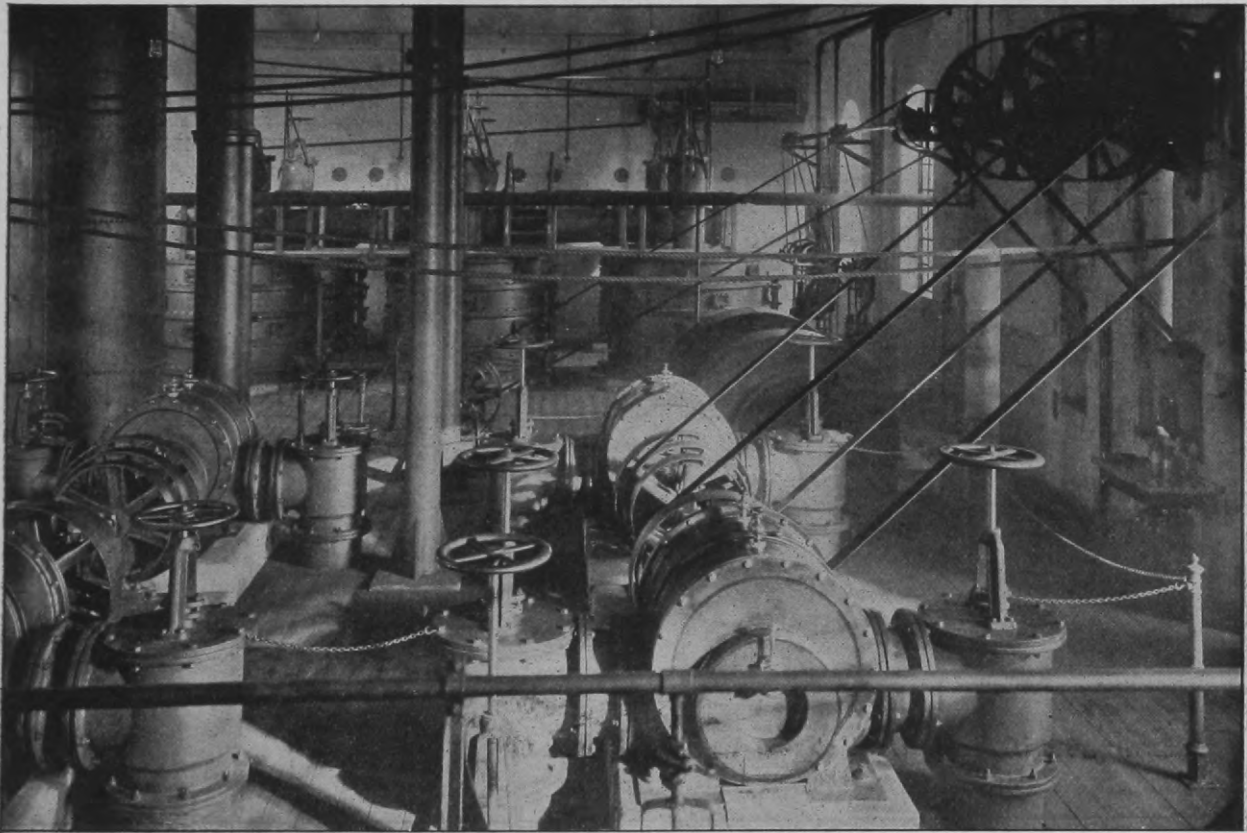


Fig. 2.—Interior of By-Product Plant

THE OTTO-HOFFMAN COKE OVEN PLANT AT RECKLINGHAUSEN II. COLLIERY.

Ruhr coal basin, 124 of the former and 8 of the latter in the Saar district, 670 Otto-Hoffman ovens in the Upper Silesia, 45 Otto-Hoffman and 30 Otto-Coppee ovens in the lower Silesia district, 178 Otto-Coppee in the Worm district, near Aix-la-Chapelle, and 240 Otto-Hoffman and 182 Otto-Coppee ovens in other sections.

Concerning the Smet-Solvay oven, the following figures have been given by F. W. Luermann in *Stahl und Eisen* July, 1894:

	Ovens in operation.	Ovens under construc- tion.	Total.
Belgium.....	227	100	327
France.....	50	...	50
England.....	30	25	55
Germany.....	48	...	48
United States..	12	...	12
Totals.....	367	125	492

whelmingly in favor of the Otto system European practice has pronounced. After thorough investigation Mr. Wilcox has reached the conclusion that it is an undeniable fact that the Otto Company obtain by far the best results, all things being equal. The principal objection raised by representatives of the other system is that the Otto plants are expensive. The chief difference of cost is in the condensation plant; but experience has shown that this is amply repaid by the larger output of by-products. All the Otto machinery, down to the smallest pump, is in duplicate—hence there is no loss from stoppages or repairs. In the Otto system the slight pressure in the flues prevents the loss of by-products and the regenerators add greatly to the ease with which these ovens are controlled and the temperature regulated, to say nothing of making available a much larger percentage of fuel gas. In spite of all said to the contrary, the other systems approach as

in one case a battery having run for 13 years with only nominal repairs. At all the plants visited the results were the same, the ovens having been in operation for periods of from 3½ to 13 years, and have required but nominal repairs. When one considers the life of the average beehive oven, this fact becomes more noticeable. One cannot but be impressed with the splendid condition of the German plants after many years of operation as compared to our American beehive ovens. It is generally admitted that there is but little difference so far as the cost of ovens is concerned. The figures obtained of the Bernard ovens in Belgium were \$590, complete; for the Otto-Coppee in Germany, \$629. As labor and material are very much cheaper in Belgium than Germany, reducing both these ovens to German prices would make the cost practically the same. It has been urged against the retort ovens that they are very expensive, but when one takes into con-

sideration the large increase in output from the Belgium ovens this objection will not hold good. Putting aside the cost of the condensation plant, experience showed that 60 Otto-Coppee ovens would produce as much coke as would 140 beehive ovens. These figures are based on the average weekly output from the beehive ovens in the Connellsville field, which is given as  $8\frac{1}{2}$  net tons of coke.

Drawings of the Otto-Hoffman oven have been so frequently published that we need not again present them. We are indebted to Mr. Wilcox, however, for an opportunity to reproduce a few of a series of photographs taken by him as showing a typical Otto-Hoffman plant, that at Recklinghausen, Westphalia. Fig. 1 shows a battery of ovens, while Figs. 2 and 3 show interiors of the recovery plant.

1.8 per cent. Quality of coke, good. Sample sent to America.

*No. 4 Test.*—Oven charged with 13,750 pounds coal (crushed), or 6.9 net tons. To this coal water was added (15 per cent.) at the suggestion of the coke master, who claimed that if the coal were crushed and wet the coke would be denser. The oven was also run hotter, owing to a mistake on the part of the night superintendent. The oven was around in 32 hours and was allowed to stand 40 hours. This plan was found to be a mistake, because, owing to the higher temperature, fine coal and water, the escaping gas and steam made a larger percentage of spongy coke in the upper part of the oven. The lower part was of excellent quality, being denser and longer than the coke in test No. 3. Total coke produced, 73.6 per cent. Good coke,

fully coked in a retort oven. The coke differs from the beehive coke in appearance when first drawn, in so far that it is more in planes and not so long in structure. This is due to the retort oven being narrower and the coking taking place from the bottom and sides, and not from the top downwards, as in the beehive ovens. The coke made was excellent. It was equal in quality to the Connellsville coke. It was not so silvery in luster as the Connellsville coke, but this cannot be expected so long as the coke is watered outside the oven. The German blast furnace engineers are doing most excellent work so far as fuel economy is concerned on lean ore mixtures. At none of the furnaces is any attention paid to the appearance of the coke. All that is required is that it do the work necessary in the furnace. Whether

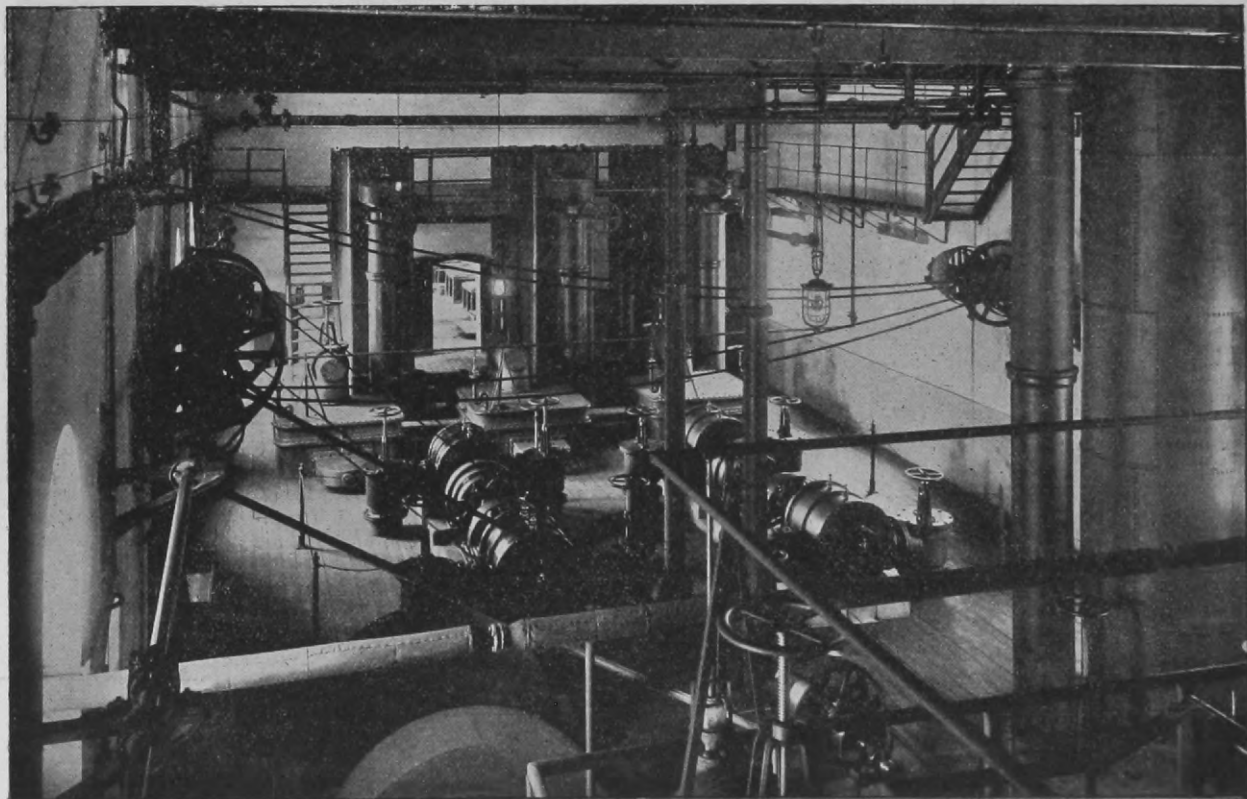


Fig. 3.—Interior of By-Product Plant.

#### THE OTTO-HOFFMAN COKE OVEN PLANT AT RECKLINGHAUSEN II. COLLIERY.

##### Tests with American Coal.

Mr. Wilcox, in order to test the Otto ovens so far as their work with American coals was concerned, took over a quantity. The first was a sample of coal taken from the H. C. Frick Company, near Scottdale, Pa., on March 3, 1894. The tests commenced on April 6.

*No. 1 Test.*—Two wooden boxes were placed in an oven and ran 48 hours. In one box was crushed dry coal and in the other run of mine dry coal. The samples were quenched carefully and a very fine coke was produced.

*No. 2 Test.*—Dry run of mine coal. Duration of process, 24 hours. Coke excellent, apparently no difference in appearance from 48 hour test. In charges Nos. 1 and 2 the boxes contained about 150 pounds.

*No. 3 Test.*—Charge of 11,000 pounds or 5.5 net tons. Duration of process, 28 hours. Yield of blast furnace coke 72 per cent.; crushed coke and braise

68.6 per cent.; spongy coke and braise, 5 per cent.

*No. 5 Test.*—Two boxes, each containing 150 pounds of coal. The oven was around in 30 hours, the quality of coke being good. One sample crushed and dry gave 72 per cent. good coke and 1.5 per cent. crushed coke and braise. The other sample crushed and wet containing 12.6 per cent. water, gave a total of 73.2 per cent. coke, of which 71.8 per cent. blast furnace coke and 1.4 per cent. braise and small coke.

*No. 6 Test.*—The ovens were cooler and charged with 7000 pounds dry crushed coal, equal to 3.5 net tons. The oven was around in 26 hours. The quality of coke was good. The quantity of blast furnace coke was 71.03 per cent., and of fine coke and braise 2.51 per cent.

##### Conclusions Drawn from Tests.

The tests showed conclusively that the Connellsville coal can be success-

the coke has or has not a silver luster made no difference.

The comparatively small amount of coal available for the experiment was a great drawback. The coal was sent to a works where one of the poorest coals in the whole Westphalian district is produced, owing to the inferior coal from this mine. This was done to demonstrate that the Otto ovens make an excellent coke if the coal is suitable. In the first test the oven was too hot, as the preliminary tests showed the Connellsville coal to be most rich in gas and easily melted. Had the oven been cooler the coke would have been longer. In the second test, owing to a mistake of the night foreman, the oven was run very hot, and as a result we got some spongy coke.

In the third test the oven was cooler, resulting in a better coke, with a less percentage of fine coke and braise. Had the oven been still cooler and fully charged, better results would have been

obtained. The tests show that in a retort oven it is not necessary to wet or crush the coal, and that the best results can be obtained from the ordinary run of mine. A comparatively large retort should be used, thus making available more fuel gas. The tests show that the process can be completed with a full charge in from 32 to 36 hours, thus insuring a much larger output from a given number of ovens than usually calculated upon, necessarily reducing labor on coke and by-products and increasing the output. Furthermore, the cooler it is possible to run the ovens the larger will be the percentage of tar, ammonia and benzole obtained. This being the case, it will be probably possible, if anything, to exceed the figures given by Dr. Knublauch, as they are based on the higher temperature required in Westphalia. The coke produced excited the greatest admiration of all the German blast furnace and colliery engineers who saw it, and a large sample was put on exhibition in the Industrial and Mining Exhibit at Gelsenkirchen.

A series of analysts were made to compare American and Westphalian coals, with the following results:

	I.	II.
Fixed carbon.....	87.017	87.250
Moisture.....	0.038	.....
Ash.....	11.320	11.995
Sulphur.....	0.860	0.746
Volatile matter.....	0.770	.....
Totals.....	100.000	99.991

No. 1: Analysis of sample of coke from Connellsville coal coked in Otto ovens at Recklinghausen II; sampled by Schniewind and Farrell. In a large sample the water was 0.29 of 1 per cent. half an hour after quenching.

No. 2: Analysis of coke, as given by J. D. Weeks in his report as being an average sample of Connellsville coke.

Dr. Knublauch remarked as follows on the result of the analysis of American coals: "The yield of gas from the samples is very high, and the illuminating power of the gas from the Connellsville coals (Nos. 1, 2 and 3) very strong. The quality and quantity of tar from samples Nos. 1, 2 and 3 is excellent. Assuming that these American coals are similar, as to their composition, with those of Westphalia (for example do not contain carbon hydrogens of the paraphene order), then we may conclude, from the illuminating power

This fact has been made the basis for objections raised by Sir Lowthian Bell, who contends that the greater volume of and higher calorific power of gases obtained from American and English coals would render it most difficult to construct and maintain ovens to withstand the higher temperature, resulting from the combustion of the gases. Sir Lowthian Bell has evidently not seen or examined the Otto plant. Had he done so he could not but admit that the quantity of gas admitted to the ovens is under perfect control and that no more is burned than is actually required. The temperature of the ovens can be maintained at any point desired. The fact of the gas from the American coal being greater in volume and higher in calorific power is an advantage rather than a drawback, for the reason that there is a much larger quantity available, and better quality, for heating purposes. Should it be desired to use the Otto-Coppee oven without the recovery of by-products, all that would be necessary to do away with the excess gases would be the adoption of a few flues or vent pipes to carry off this excess.

The Quality of the Coke for Blast Furnace Use.

One of the objections usually raised by coke producers against the introduction of retort ovens is that the coke made in beehive ovens carries a greater burden. This has been strengthened by a test made by Sir Lowthian Bell, who compared the results of beehive coke against Simon Carves coke, using 5600 tons of the latter. He claimed that its efficiency was only about 90 per cent. of the former, which practically offset the higher yield of coke in the Simon Carves over the beehive oven. The results obtained by German furnacemen with retort coke, however, are such that the statement has been made: "If that is what they can do, the sooner American iron masters get such coke the better."

Mr. Wilcox visited a number of German works, and reports the following results: At the works of the Hoerder Eisenwerk in Hoerde, the manager, Mr. Hilgenstock, stated that his ore mixture through the furnace is 44 per cent., and his maximum coke consumption of 2000 to 2260 pounds of iron. The ores are easily reduced, and the product is high silicon Bessemer. He claims that after careful investigation his company erected 200 Otto ovens in preference to those of any other system, that they have never regretted this decision, and that after running 13 years the repairs on these ovens have been simply nominal.

At Heinrichs-Huette, at Hattingen, the ores are barely all hard local fossils running 43 per cent. through the furnace, and the fuel consumption is 2240 pounds of coke to 2240 pounds of iron. Here they have 150 Otto ovens.

The third plant is that of the Schalker Gruben und-Huetten-Verein in Bulmke. The ore mixture through the furnaces runs 47 per cent., the output is 200 tons daily of Bessemer iron. The coke consumption per ton of iron is 1980 pounds. The concern has 180 Otto ovens and will build more this coming summer.

The fourth plant was the Eisenhuette Phoenix in Laar, by Ruhrort. The output is Bessemer iron; the ore mixture through the furnace being 52 per cent. The coke consumption per ton of iron is 1900 pounds. The iron high silicon Bessemer. The management is perfectly satisfied with retort coke ovens.

Analysis of Connellsville and Pocahontas Coals Compared with Westphalian Coals.

Coal.	I. Connellsville.	II. At West Superior.	III. Connellsville.	IV. Pocahontas.
Cubic feet gas per ton coal.....	9,318	9,630	9,190	9,126
Percentage of coke.....	73.25	72.75	72.30	84.82
Percentage of tar.....	4.00	3.80	4.00	1.70
Percentage sulphate ammonia....	0.992	1.01	1.066	0.716
Illuminating power.....	0.53	0.515	0.58	0.42
Percentage coke, crucible test....	69.23	68.54	68.44	81.78
Percentage ash, crucible test.....	8.32	10.93	8.45	5.96
Percentage moisture, crucible test	1.29	2.02	1.47	1.55
Percentage sulphur, crucible test.	.....	.....	0.64	0.76

Coal.	V. Connellsville.	VI. Connellsville.	VII. Westphalia.
Water.....	Average. 1.60	1.47	.....
Volatile matter.....	30.107	30.09	29.64
Fixed carbon.....	59.616	59.35	59.72
Sulphur.....	0.784	0.64	.....
Ash.....	8.23	8.45	10.84

No. 1. Sample of coal from H. C. Frick Company's Valley Works, near Scottsdale, Pa. Sample taken from cars coming from mine, March 3, 1893, by Schniewind and Farrell. No. 2. Sample of coal from Lehigh Coal Company's docks at West Superior, Wis. Exposed on docks for seven months. Samples taken February 15, 1893, by Austin Farrell. No. 3. Average sample from 120 barrels H. C. Frick Company's coal from Valley Colliery, sampled at Coke Works, Recklinghausen, on arrival of coal, April 6, 1893. No. 4. Sample of Pocahontas coal from Echman Colliery, Flat Top District, sampled by manager, March 3, 1893. No. 5. Average analysis of coal as given by J. D. Weeks in his Government report. No. 6 Sample of Connellsville coal from Valley Works of H. C. Frick Company. Analysis made by Dr. Knublauch. No. 7. Analysis of Recklinghausen No. 2 coal, sampled by Schniewind and Farrell, at Recklinghausen Colliery, Westphalia. Analysis by Knublauch.

The following is an analysis of coke made in the Otto Hoffman ovens at No. 2 Colliery, Recklinghausen, compared with an average analysis of Connellsville coke as given by J. D. Weeks in his Government report:

of the gas as well as from the quality and quantity of the tar, that benzole is present in larger quantities than in Westphalian coal." Engineer Mein of the Otto Company, and Mr. Borges, coke superintendent at Recklinghausen, agree with Dr. Knublauch as to the above. The officers of the Otto Company state that in basing their calculations as to the value of new coals they are always guided by Dr. Knublauch's analyses, and that in all cases they find by practical experience that they get rather over than under the percentage of by-products, as shown by his analysis.

There is a large amount of fuel gas available in the Otto system. This gas has a higher calorific power than the ordinary producer gas. It is perfectly stable and can be carried long distances as easily as illuminating gas. It is universally used at the different plants visited for generating steam for their separating plants and other purposes. At the works of Mahr, Ostra, this gas is conveyed through a 3-inch pipe for over 1/2 mile and used to generate steam at a rolling mill, where the results obtained are most excellent. The gas from the Connellsville has a greater calorific power than gas from the coals obtained from Westphalia and Austria.



The fifth plant was that of Bochumer Verein, at Bochum. The output is Bessemer pig; the ore mixture through the furnace being 45 per cent. The iron produced is very high in silicon. The consumption of coke is 2100 pounds per ton iron. The coke is made in Otto ovens.

The sixth plant was that of Sophien Huette, at Mahr-Ostra, Austria, who make special high silicon foundry iron and mill iron. The foundry iron contains 4 per cent. silicon, and they make 95 per cent. No. 1. This special iron requires 2850 pounds of coke to 2240 pounds of iron. In mill iron the consumption of coke is 1980 pounds. The ore mixture through the furnace is 50 per cent. All the ovens are Otto. An additional number will be built this summer. The coke is inferior, but this is due to bad quality of coal. It could not well use it without the Otto ovens. It will be noticed from these data that the fuel consumption is most excellent considering the mixture, and compares favorably with our best American practice.

Yield of By-Products.

A very considerable difference exists between the various systems of coke ovens used in Europe in the quantity of by-products obtained. The following data, collected by Mr. Wilcox, give the comparative yield of by-products obtained from similar coals by different systems covering the same period of time. This comparison speaks for itself. It has shown the superiority of the Otto to the other systems. The figures are taken from the books of the different companies, and in the case of Mr. Huessener were immediately after the plant had been thoroughly repaired, while the Otto ovens had been running for a period of three and one-half years with no repairs whatever. The coals were substantially the same, with the exception of Seibel, which should have a still larger yield than that of any other records, by the admission of their own representatives:

System.	Time.	Ammonia Sulphate.	Tar.	Per cent.
Otto-Hoffman	Oct. '92-Mar. '93.	1.18	3.53	
Carves-Huessener.	Oct. '92-Feb. '93.	1.00	1.81	
Semet-Solvay	Oct. '92-Mar. '93.	0.61	1.60	
Seibel	Oct. '92-Mar. '93.	0.50	3.00	

All the works visited in Europe claim profits and look prosperous. How these profits vary can be seen by examining the table of comparative yields. If the Seibel people claim a profit, and they are running to-day and have run for years, how much more in comparison must be the profit of the Otto people?

It may be of interest to present the following data concerning the work of the Otto Hoffman plant at No. 2 Colliery, Recklinghausen, near Bochum, Westphalia. It consists of 60 ovens and the very substantial condensation plant shown in our engravings. It has run 3½ years and thus far has had no repairs. The coal is poor, as the following analysis shows: Volatile matter, 29.64 per cent.; fixed carbon, 59.35 per cent., and ash, 10.64 per cent. The yield in coke varies from 74 to 84 per cent., and the yield of braise 2 per cent. The coke is controlled by the mining company, who limit the time at which the ovens shall be run. If it were extended to 48 hours, the coke would be better. The charge per oven is 6.76

net tons of dry coal, which carries 12½ per cent. of water, and the average running time is 40.8 hours. The ovens, which have the dimensions which are standard in Westphalia, are 21.5 inches at the small end and 25.3 inches at the large end. They are 32.8 feet long and 5 7 feet high. The following is the crew required to run the plant:

Men employed—	
1 Foreman at \$37.50 per month and house.	
1 Assistant at 86 cents per day and house.	
Coke ovens—	
Day. Night.	Per man per cent.
3 3	Levelers and quenchers... 5.7
2 2	Door closers... 5.7
2 2	Coal fillers... 5.4
2 2	Trammers... 5.2
1 1	Engineer (pusher)... 5.7
10 10	

Labor per oven filling, tramming, closing, leveling, pushing and quenching is 55½ cents per oven.

Day. Night.	Loaders paid 4 cents per ton.
1 1	Removing braise 76 cents per day.

Labor per net ton of coke, including superintendent and loading on cars, 16½ cents, based on six months' run. Ovens drawn, 5394; coke produced, blast furnace, 19,812; crushed, 5635; total, 25,447 gross tons; net tons, 27,992. Coal used, 36,550 net tons. Total coke, 76.5 per cent.

Condensation Plant.

1 foreman	\$65.40 per month and house.
1 assistant	\$41.70 per month and house.

Both Shifts Together.

2 engineers, at 83 cents.	\$1.66
4 men in ammonia factory, at 80 cents.	3.20
2 valve men, at 83 cents.	1.66
4 pipe cleaners, at 78 cents.	1.56
1 water tender, at 82 cents.	.82

Total	\$8.90
Total labor for six months.	\$2,266.85
Sulphuric acid required 431 T. at \$6 80.	2,930.80
Sundries	610.00
Total	\$5,807.65

Product of Recklinghausen No. 2 for Half Year Ending March 31, 1893.

	Tons.	Per cent.
Ammonia sulphate	431.3	1.18
Tar	1,114.8	3.05
Pitch	173	.48
Blast furnace coke	19,812	54.2
Crushed coke	5,635	15.1
Coal equivalent of gas	4,380	12
Total	31,546.1	86.01

Gases.—After heating the ovens and furnishing steam for the condensation plant, there is enough gas to develop 360 horse power, 290 of which is used by the mining company to run their washing, screening and separating plant. There are two water tube boilers, 180 horse-power each, similar to the Babcock & Wilcox. The average daily excess gas is 1,112,000 cubic feet.

Yield of Tar and Ammonia.

Month.	Year.	Pitch.	Tar.	Ammonium Sulphate.
October	1892	0.67	3.00	1.16
November	1892	0.64	3.00	1.17
December	1892	0.46	3.20	1.19
January	1893	0.29	3.02	1.16
February	1893	0.36	3.08	1.20
March	1893	0.43	3.01	1.21

Benzole.....0.3 to 0.7 per cent.  
Present Value of By-Products—End of March, 1894.

	Per pound.
Ammonium sulphate	0.025
Tar, per net ton	6.43
Pitch, per ton	5.14
Benzole, per gallon	0.52
Sulphuric acid 60 B. per net ton	6.80
Blast furnace coke (ovens)	2.40
Foundry coke	3.00
Crushed coke	3.15
Coking coal	1.20

Coke Produced and Ovens Turned Out.

Month.	Dry coal coked. Net tons.	Furnace coke.	Crushed coke.					Number ovens drawn.
			1	2	3	4		
Oct.....	6,338	3,503	451	429	250	110	1,240	937
Nov.....	5,954	3,456	335	478	231	104	1,148	800
Dec.....	6,074	3,547	429	363	187	88	1,067	889
Jan.....	6,122	3,938	368	225	151	95	839	905
Feb.....	5,490	3,300	319	319	291	107	1,036	812
Mar.....	5,568	4,048	390	225	209	126	950	971

The ovens are 17 inches wide at one end and 13.5 inches at the other end; the length is 30 feet and the height 5 feet. The ovens take a charge of 4.6 net tons dry coal. The amount of gas produced is 4,236,000 cubic feet daily. Of this five-sevenths is used at the ovens, the excess of gas being 1,210,000 cubic feet. The power required for the condensation plant is 50 horse-power. The five double cylinder boilers, of a French type, with 915 aggregate horse-power, are heated by waste gas. In addition to this some gas is used for drying ammonium sulphate. These boilers are situated at the rolling mill, about a quarter of a mile distant. The following are the results:

Average Figures for Year 1892-1893.

Number of ovens run	2716 net tons.
Running time	32.1 hours.
Charge per oven (dry coal)	4.6 net tons.
Sulphate of ammonia per mo. (average)	163 net tons.
Tar per month (average)	442.6 net tons.
Pitch	90 net tons.
Price sulphate of ammonia, per pound, 0.026	\$52.00
Tar	6.00

Percentage of By-Products.

	Per cent.
Sulphate of ammonia	1.337
Tar	3.540
Pitch	0.720

Profits.—Profits from condensation plant alone, including everything except taxes, is \$71,450.80 for the past year. The ground is gradually settling, but no repairs in the ovens have been necessary, and no trouble has been experienced.

This plant costs complete, including ovens, condensation plant, laboratory, tools, electric light, in fact, every detail complete, and the plant put in operation, 750,000 marks, or \$178,600. This includes Dr. Otto & Co.'s profits for erection and royalties. Dr. Otto & Co. erected the plant, and after a certain number of years turned it over to the colliery free of charge.

The following data were collected by Mr. Wilcox at the coke works in Mahr. Ostra: The coal is not very good, being high in ash, and contains 15 per cent. of water. Of the coal used 81 per cent. is washed and 19 per cent. not washed. Loss in washing coal is 15 per cent. Coal very meager. The yield is 70 per cent. of blast furnace coke and 4 per cent. of small coke and braise. Although the plant has been running for three and one-half years, the repairs have been practically nothing. The percentage of water in the coke is 1.5 per cent.

According to elaborate statistical returns lately issued by the British Board of Trade the total existing tonnage of the British merchant navy is more than that of all the other nations of the world together. The exact figures given are: Total tonnage of the world, 24 569,496; total British tonnage, 12,969,951.

### Forging by Hydraulic Pressure.

From a valuable paper on forging by hydraulic pressure, read by the eminent authority on this subject, Ralph Hart Tweddell, before the Institution of Civil Engineers, we take the following:

The introduction of the hydraulic forging press is due to M. Gledhill, managing director of Sir Joseph Whitworth & Co. About the years 1860-61,

vance in constructive machinery is due, and in support of this statement Colonel Dyer of the Elswick Works thus writes to the author:

"The introduction of hydraulic forging is undoubtedly due to M. Gledhill, who for many years has been the managing director of the well-known works of Sir Joseph Whitworth of Manchester. He introduced the system and perfected all the details; if you apply to him he will supply you with the whole history of hydraulic forging.

assorting of iron and the treatment of the metal in the furnaces, there is no intention to draw distinctions; but as to the treatment of the metal after casting, there can be no doubt of the superiority of the system adopted by Sir Joseph Whitworth over that of all the manufacturers in the world. . . . It is only from personal observation that the merits of the system can be fully appreciated.

"The system of forging consists in compressing the liquid metal in the

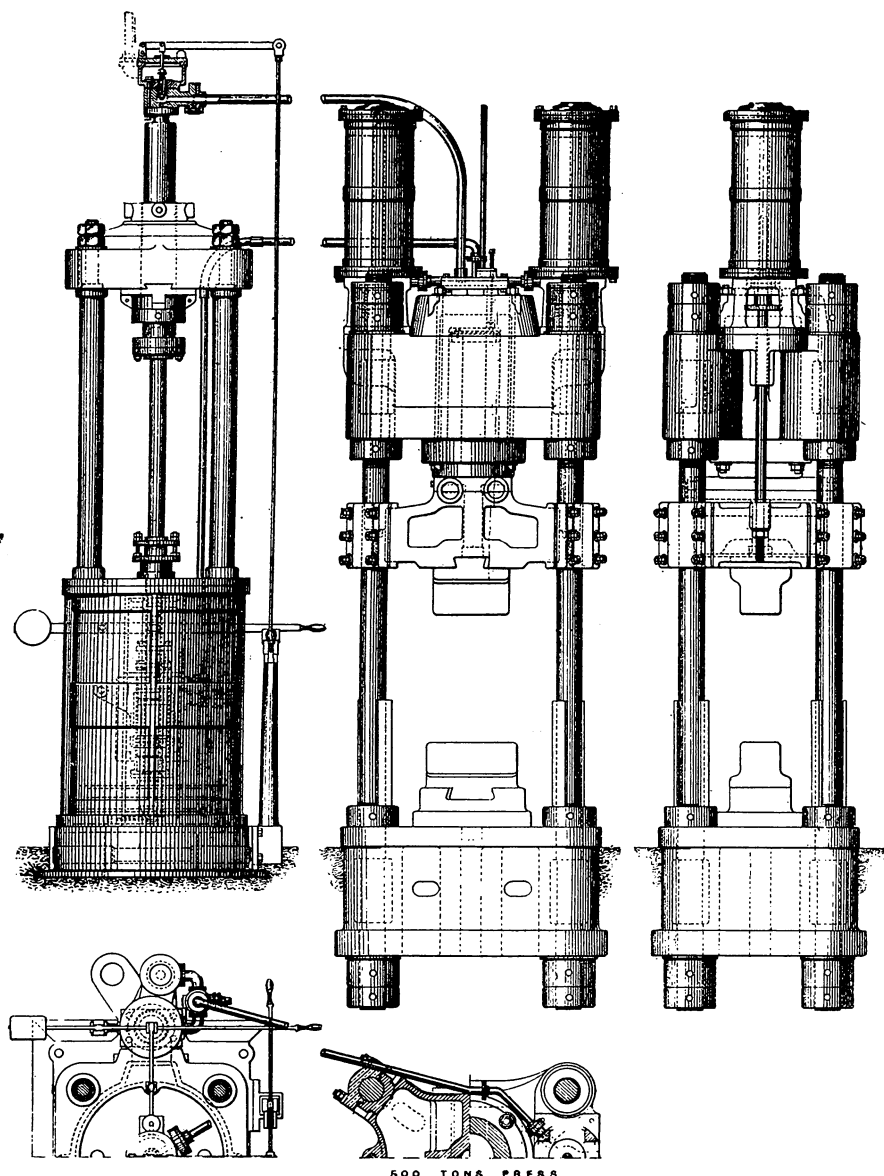


Fig. 1.—The Greenwood and Batley Press.

### FORGING BY HYDRAULIC PRESSURE.

the firm in question had considerable trouble in obtaining steel suitable for the manufacture of guns. So far as the art of steel manufacture was then understood, nothing could be alleged against its quality. It was this which suggested to Sir Joseph Whitworth the idea of subjecting this material to a very high pressure when in a fluid state, his notion being that this compression could be applied not only to ingots but to castings of all shapes. This, however, was not found practicable, and it was then that Mr. Gledhill suggested forging the ingot after compression in a suitable hydraulic press. The author has taken some trouble to ascertain to whom the credit of so distinct an ad-

Everything which has been done as regards hydraulic forging both in England and abroad is an imitation of the system which Mr. Gledhill perfected."

It is generally understood that a similar system of forging is in use at Elswick, but the author has not been fortunate enough to see it in operation there.

The members of the United States Navy Gun Foundry Board thus reported their impressions on a similar occasion:

"In speaking of the Whitworth establishment as unique, and of the process of manufacture at that place as a revelation, reference is specially made to the subject of forging. As to the

mold immediately after casting, and in substituting an hydraulic press for the hammer in the subsequent forging of the metal. . . ."

After describing in general terms the mode of working the press, the board proceeded to say:

"The effect produced by it (the press) requires to be seen to be thoroughly appreciated, and is altogether different from that produced by the hammer. The heated ingot resists the blow of the hammer, but the insinuating, persevering effort of the press cannot be denied. The longer time (several seconds) during which the effort lasts is a great element in its successful effect. As pressure succeeds pressure, the sta-

blity of the particles is thoroughly distorted, and a veritable flow of metal induced, which arranges itself in such shape as the pressure indicates, the particles are forced into closer contact, and the whole mass writhes under the constraint which it is impotent to resist.

"The board witnessed the operation of casting, followed by that of liquid compress, the enlarging of hoops, the drawing out of cylinders, and the forging of a solid ingot. The unanimous opinion of the members is that the

since that date. In 1861—about the time that Whitworth made his first press—John Haswell (an Englishman) introduced his hydraulic press into the shops of the Imperial and Royal Private State Railway at Vienna. This, however, was not a forging but a stamping-press, and has been described as follows:

"The system may be compared somewhat to forging in dies under the steam hammer; but it permits the work to be finished much more accurately, and it also enables forgings to be produced

The author had some interesting correspondence with the late Mr. Haswell about 20 years ago, and there can be no doubt but that to him is largely due the present use of hydraulic pressure for forging and working metals. Mr. Haswell's free publication of his method of working, and the results he obtained abroad, undoubtedly did much to popularize the hydraulic system and to set other minds at work. The experiments made by Professor Tresca on the "Flow of Solids" undoubtedly also led many engineers to study the question of forging scientifically, and indirectly assisted the introduction of the hydraulic forging press.

#### Conditions for Successful Forging.

In order to insure success in the application of the hydraulic press to forging the following conditions must be fulfilled:

1. The press must be so proportioned as to insure the utmost rigidity, any movement of the main columns of course interfering with the correctness of the work.

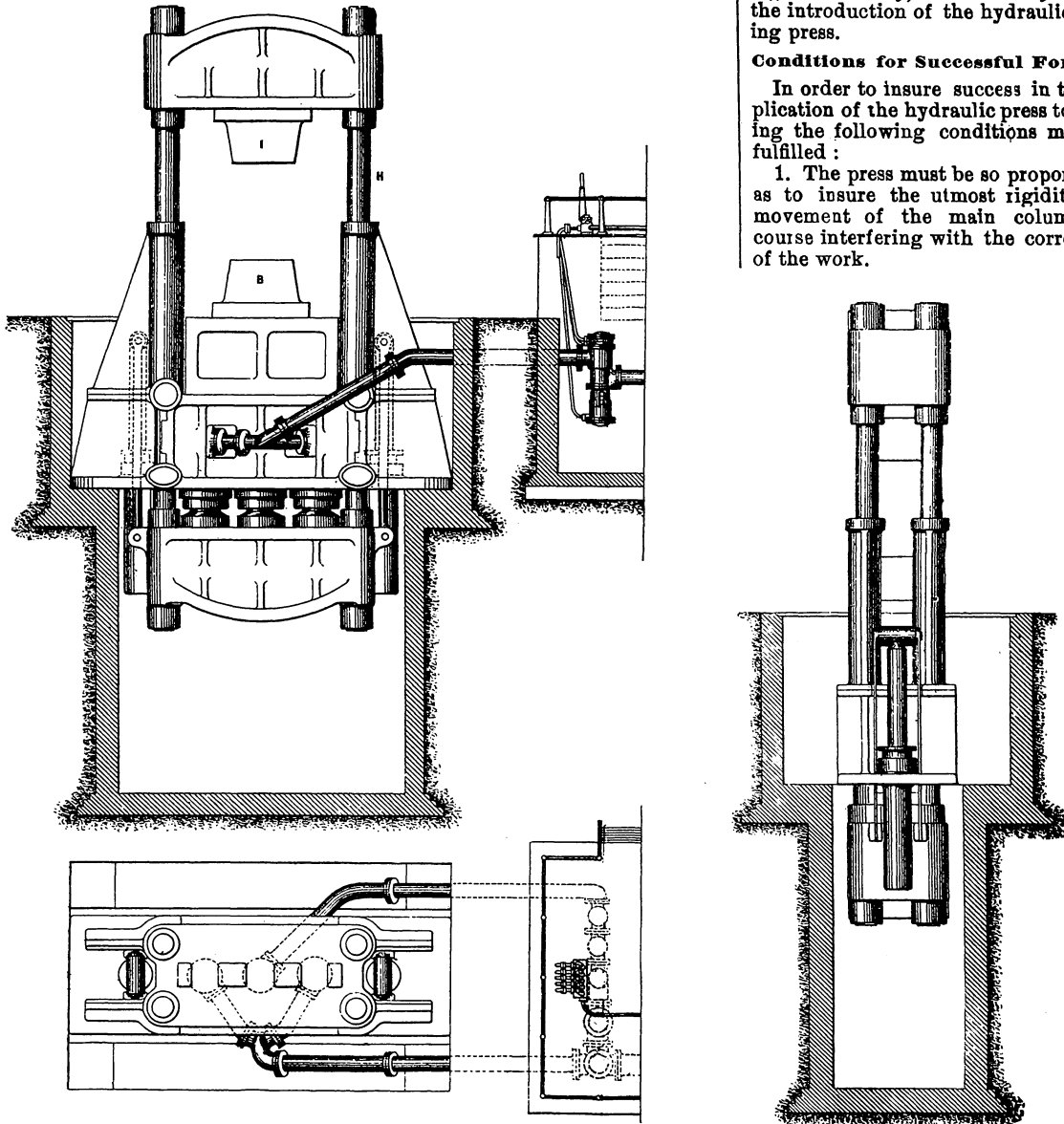


Fig. 2.—Tweddell, Platt and Fielding System.

#### FORGING BY HYDRAULIC PRESSURE.

system of Sir Joseph Whitworth & Co. surpasses all other methods of forging, and that it gives better promise than any other of securing that uniformity so indispensable in good gun metal."

The author has quoted this report because of its conciseness and the correctness of its forecasts, and because it exactly describes the effect (so far as it speaks of the process of forging) produced on his own mind by a visit paid by him to the Whitworth Works. It must be remembered also that the report refers to a visit made ten years ago, and that many applications and advances in the introduction of hydraulic forging-presses have been made

which could never be otherwise manufactured under the hammer. This mode of production offers the incalculable advantage of very great cheapness, and also the possibility to forge all details out of one piece, which it was necessary, formerly, to build up out of several detached pieces, and lastly, their exceeding quickness of manufacture."

Haswell divided the classes of work which he proposed to do into four heads:

1. Subpressing with closed dies. 2. Subpressing combined with punching. 3. Pressing for drawing steel (producing axles, &c.). 4. For jumping up and finishing parts of frames.

2. The crane power must be not only ample, but so arranged that enormous weights, in many cases amounting to from 100 to 120 tons, can be manipulated by unskilled laborers. Hydraulic power, on the whole, seems to be the best to enable this to be done.

3. The details of the construction of such parts as the valves and pumping arrangements must be as perfect as possible.

4. A considerable amount of ingenuity and practical experience is required in making suitable tools for attachment to the press.

Assuming that a maker has appliances for making the large castings, in many

cases weighing 70 tons each, and steel columns, in some instances 26 inches diameter and 42 feet long and weighing, say, 35 tons each, the first of the above conditions is perhaps the least difficult to fulfill. For the smaller presses, if sufficient thought is bestowed upon it, the design presents no great difficulties, and the simpler the arrangement the better the press as a working tool. But it may be taken as an axiom that the greater the rigidity of the press the better the quality of the work done by it, and it is desirable to impart the power of the same to the work in hand and not to distorting the press.

The second condition, that of crane power, is met in various ways by different firms. As a rule, traveling cranes worked by steam are preferred, but in other cases hydraulic lifts are employed to great advantage. In connection with this subject a great deal will depend upon the discipline and the organization of the men working the press. It is a curious fact that Nasmyth, so far back as 1854, patented an arrangement of hydraulic cranes to "facilitate the forging of iron," which shows his wonderful grasp of the conditions necessary for successful working. But in actual work the third condition is the most essential of all and by far the most difficult to fulfill. A large hydraulic forging press renders a very high working pressure of water necessary, in order to obtain the required power in a cylinder of practicable dimensions. The pressure varies between 2 and 3 tons per square inch, and with water under such pressures, working machines subject to considerable shocks, it is very difficult to keep valves and joints tight. This difficulty is increased by the intermittent character of the working of these large hydraulic presses. An ingot weighing, say, 30 tons, will be 24 hours in the furnace, and perhaps require only an hour to be drawn down to the required shape in the press, and any practicable multiplication of furnaces will still leave the press idle perhaps three-quarters of the working day. On the other hand, when an ingot is once out and in the press, every joint must be tight and in order; otherwise the loss is great, and as a matter of fact the success of a press depends upon these details. Most of these difficulties are due to water being practically inelastic. This, while constituting its chief advantage for such work, involves an immediate loss of pressure if there is the slightest leakage. There is none of this trouble with the smaller presses, which only require a working pressure of 50 or 100 atmospheres to obtain the necessary power.

#### Systems of Working.

To overcome this trouble with the packings and valves of large presses, several systems of working them have been devised, having different combinations of pumps and reservoirs. Among these are the following:

In the Whitworth press the movements of the main ram necessary to enable the ingot or other work to be adjusted, and of the lifting cylinders, whose rams effect the return or upward stroke of the press, as well as the cranes and lifts used for taking the work to and from the furnace, are worked from an accumulator loaded to a pressure of about 2 tons per square inch. This insures quickness of action. In order to control with ease and promptness the action of the forging ram, the water from the pumps is directed into the ram cylinder by closing an escape valve; two valves are employed, the larger of which is the main valve. When this is

raised the water passes freely without acting upon the ram of the forging cylinder and the engine is instantly relieved of the load. As already stated, the return stroke of the ram is then effected by pressure from the accumulator of the lifting rams; and by suitable valves the engine is relieved from its load except during the period when the forging ram is actually squeezing; this work therefore is not done from an accumulator, but direct from the pumps.

In the Davy press, water pumped into an air receiver in which a pressure of 60 pounds per square inch is maintained, is used for filling the main cylinder during the idle portion of its stroke, and is also

a "direct steam driver." This apparatus is well known under the name of an "intensifier," in which a piston of considerable size is forced outward by either steam or water at a moderate pressure, and this being connected with a much smaller piston working in a hydraulic cylinder, the pressure in the latter is increased inversely as the areas of the pistons. Since this "direct steam driver" is only simple acting, after the contents of one are delivered into the forging press, the latter will cease working until the high pressure cylinder is filled again. The chief merits claimed for this system are that it has no valves in the moving high pressure column, and that it combines

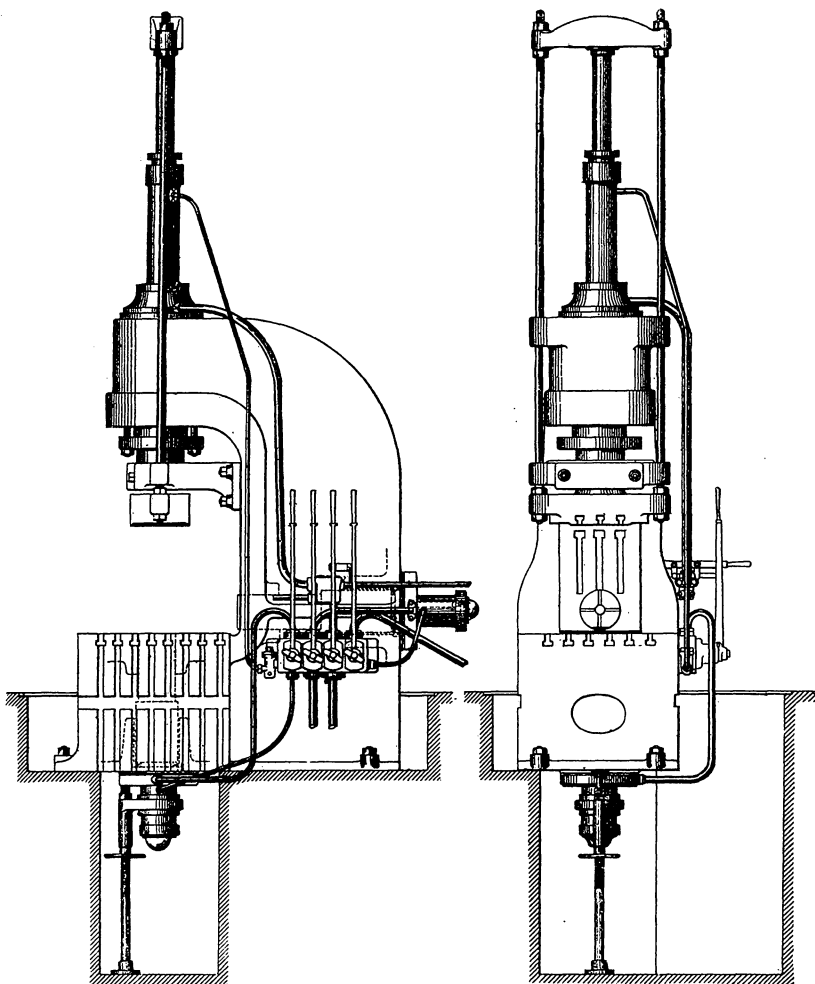


Fig. 3.—Press Supplied Great Western Railway Company.

#### FORGING BY HYDRAULIC PRESSURE.

in connection with the suction valves of the pumps. The pressure required to do the work is obtained direct from the pumps. The lifting and return motions in the Davy press are also done direct from the pumps. In this case, too, only the actual pressure required need be exerted by the pumps.

In the Walker press the pressure water required to effect the forging and to make the return motions of the press is admitted direct from the accumulator; but arrangements are made to admit low pressure water into the large cylinder when it is descending and not pressing the ingot.

In the form of press introduced by Greenwood and Batley there are, strictly speaking, no pumps used. The power necessary to press the work is obtained by means of what is termed

(though in both cases within a very limited range) the properties of a force pump and an accumulator, without the trouble of the valves of the one and of the shock from the arrested momentum of the other. On a similar principle is A. B. Brown's hydraulic forging press, in which the main cylinder of the press is connected to a steam accumulator or intensifier, and discharge pipe, for adjusting the highest position of the main ram in combination with a valveless connection between the main cylinder and a hydraulic cylinder, in which works a small ram moved by a piston in the steam cylinder.

Forging involves in many cases the production of irregular forms from large masses of steel. Seeing that the ingot is generally of a rectangular shape, it requires considerable clearance to

allow of its being turned over between the top die and the anvil, which means a long and variable working stroke of the hydraulic ram. But in the early days of hydraulic presses there were practical difficulties in obtaining material strong enough for cylinder castings of the required length. This difficulty has now been entirely overcome.

#### Hydraulic Press vs. Steam Hammer.

The author now proposes to consider the relative merits of the hydraulic press and the steam hammer. To those who have during the last ten years observed the gradual change of opinion on this subject it seems almost to be slaying the slain to give reasons in favor of the use of hydraulic power. Some 20 years ago, in the course of a discussion on a paper read by the author advocating the use of hydraulic pressure for forging, the late Benjamin Walker stated that the prejudice against the introduction of steam hammers into a new iron works, in which he was interested, was so great that they were completely excluded in favor of the old helve hammer; in fact it was stated that good iron could only be made with the helve hammer. Subsequently steam hammers were admitted when it was found that not only could the iron be more easily worked, but that less skill was needed; the practical reason of its superiority being that the work could be more easily dealt with by them than under the old helve. Very much the same class of objections were made to the introduction of the hydraulic press, and now its followers often overrate the advantages of the press and will hear nothing good of the hammer. As a matter of fact, so long as the steam hammer is powerful enough for its work it has the same effect on the material as a press, and owing to the sharp blow it can give, it possesses, in some cases, advantages over the latter. For example, in finishing off work the rapid succession of light blows gives a finish to the work; and in the case of welding many forge men maintain that the blow from the hammer expels dirt or scale, which in using the press is left in the forging. On the other hand, a large amount of satisfactory welding is done under the press, and the author has seen a 40 ton press working up fag-gots satisfactorily from select scrap into forgings for the best class of engine work.

But while there is still a large field for the steam hammer for work of ordinary size, and for the preparation of work to be finished in a press, the hydraulic press is the only tool which can practically be made of sufficient power to convert ingots weighing from 30 to 60 tons into shafts, guns or armor plates.

The hydraulic press became a necessity as soon as the effect of the steam hammer was found to be only skin deep. This was not due to the action of the hammer, but rather to its want of size, and the well known "awful examples" generally given to show the different appearance of a forging acted upon by pressure and by impact are approximately only correct if the hammer is not equal to its work. At the same time it is certain that the steady effort of the press penetrates the forging much farther than the blows of the hammer. This is well illustrated in ordinary riveting where the holes are completely filled by the rivet, when hydraulic pressure is applied, while the effect of the hammer is chiefly expended in spreading out the heads.

According to Fairbairn, an ingot weighing 22 hundred weight, shown at the 1851 exhibition by a Sheffield firm, was considered quite exceptional. Ingots are now frequently cast weighing 60 to 80 tons. It is evident that the inertia of such masses will absorb the blow of even a large hammer on its surface only, and in any case a large number of blows is required, which means time and consequent cooling of the ingot. In the hydraulic press, so long as the pressure is maintained, the tool continues to travel, treating the huge steel ingot much as if it were a mass of putty. It must, however, be remembered that this steel ingot is perfectly homogeneous, and the work to be done differs in character from that formerly required when large guns and shafts were made of iron and built up in pieces. Fairbairn wrote, "Nothing could be better adapted than the steam hammer for building up a large mass by the union of successive portions, since the *vis inertiae* of the slabs to be welded on to the original core is not so great as to absorb the momentum of the falling hammer; hence a large portion of the power it acquires in falling is transmitted to the surfaces intended to be united. But in forging and shaping large masses of cast steel, all these favorable conditions are reversed, and the steam hammer ceases to be an implement well adapted to the purpose."

Having now referred to the history of the introduction of the hydraulic forging press, to the different systems of generating the force it is required to exert, the author will in conclusion state the advantages claimed for the hydraulic forging press. Much thought has been expended in trying to calculate what size of hydraulic press is equal to a steam hammer capable of exerting a given force of blow. But it is hardly a question worth pursuing. Owing to the action of the hydraulic press being constantly progressive, the tool continues to force its way into the ingot until its resistance to alteration of form is equal to the pressure on the ram, or until the latter is removed. In this it differs entirely from the action of a hammer, which, having delivered one blow, does no more work on the forging until the next blow is delivered. This constitutes the essential difference between the two machines. The effect of the hammer is momentary, and there is not time for the pressure it gives to penetrate the metal, much less to alter its form to any extent at one blow; but in the hydraulic press the same rate of working per hour can be maintained, while the material is allowed every opportunity to flow in the required direction without injury. The effect of hydraulic pressure on forgings is to increase their homogeneity. A leading firm in Sheffield informs the author "that the tests got from pressed steel are a long way better than hammered steel." While the blow of a steam hammer is given with least effect when it is most required, since it cannot get its full stroke until the forging is reduced in size, the hydraulic press exerts its full power at any point in its stroke.

It may, the author thinks, be taken as an axiom that waste of energy and noise are convertible terms. The power of the hydraulic press is practically all exerted upon the forging, and not dissipated in shocks to the framing and foundations. This is easily proved by the fact that the hydraulic press is self contained, and does not require foundations like those of the steam hammer; and the effects of its blows are not felt

in the shops or adjacent buildings. Sir James Kitson has said that the percussive force of the steam hammer was of advantage in getting rid of the cinder in puddled iron, but with steel such violence is not required, in fact undesirable, and has been, therefore, abandoned. A hydraulic press occupies much less headroom than a hammer, and consequently traveling cranes can be used, passing, if necessary, over the press.

Not only can more work be turned out by a press than by a steam hammer in a given time, but it can work through a much greater range; for, while the effect of a "blow" shortens the life of any of the tools or dies used, it renders impracticable the use of the numerous stamping dies and molds which are satisfactory under a steady pressure. A great deal of other work besides forging can be done in the same press by simply substituting suitable tools for flanging plates, punching large holes, bending armor and other plates, &c. But, apart from this, the art of forging large masses has made distinct advances since the introduction of hydraulic pressure; for it was formerly impracticable to forge the hollow marine shafts at present used, or to draw out gun tubes or hoops on mandrils supported on suitable standards.

#### Greenwood and Batley Press.

This machine is a combination of the forging press proper and a steam and hydraulic driving apparatus; the latter consists of a single acting steam cylinder, with a piston rod working in a smaller hydraulic cylinder. The press proper, Fig. 1, consists of a cast steel hydraulic cylinder and cross head (cast in one), connected by four columns to a cast iron foundation plate, having a planed surface for the forging tools. The columns are prolonged above the hydraulic cylinder and cross head, and carries a steam cylinder, used for raising the cast iron hydraulic ram with the cross head and tools. The steam supply for this raising cylinder is controlled by the regulator used for the driving apparatus. The hydraulic forging cylinder is connected to the driving cylinder without the intervention of any valves. On actuating the hand lever of the regulator, the steam in the raising cylinder is released, and the ram cross head falls by its own weight and rests on the work to be stamped. A further movement of the lever in the same direction admits steam to the driving apparatus and the full hydraulic pressure is applied. On moving the lever in a contrary direction steam is admitted to the raising cylinder, and the ram cross head (which is guided by the four columns) is quickly raised, the superfluous water in the hydraulic forging cylinder is returned to the supply tank. There is an automatic arrangement for keeping the main cylinder and pipes full of water while the ram cross head is being quickly lowered to the work.

#### Tweddell, Platt and Fielding System.

Fig. 2 shows a design for a 1000-ton triple power forging press, the object of the arrangement being to allow as much clear space as possible for the cranes and gear above the anvil. The cylinders are placed below the ground level and are arranged in a set of three. This not only keeps them of a manageable size and reasonable cost for very large presses, but admits of three powers being readily applied, thus effecting a great saving of pumping power. By far the larger portion of the weight be-



ing below the floor level, great steadiness is insured. A stationary base carries an anvil. In this base are arranged the cylinders, one or more with their rams projecting downward and pressing on the lower cross head. This cross head is connected to an upper cross head by columns, which are guided through the base. The upper moving tool or die is attached to the moving cross head. The return motion can be effected in any convenient manner. In the diagram it is shown done by rams. The cross heads are at first allowed to fall by gravity (after having been raised in the first place by the lifting rams), low pressure water filling up the space left in the cylinders by the outgoing ram. Then the high pressure is applied for so long as is desired. On opening the exhaust valves the upper tool is again raised by the rams.

Fig. 3 represents a 200-ton press of the class supplied to the Great Western Railway Company, Swindon. With these presses a great variety of work is done, including all the fittings required for railway rolling stock, also stamping the receiver ends for air brake vessels, and various details for locomotive engine forgings.

In addition to the ordinary vertical press cylinder, this press has a horizontal ram at the back, also a supplementary ram in the bottom of the casting, the sides of which are planed and slotted in the same manner as ordinary drilling or shaping machines. The capacity and range of work of such a tool as this are very great.

#### A Large Electric Contract in Chicago

Another heavy contract for electric street railway equipment was closed in Chicago on the 31st ult. The Chicago City Railway Company, operating a very extensive system on the South Side of the city, contracted with the Westinghouse Electric Mfg. Company for \$300,000 worth of electric machinery, with which it is proposed to operate trolley lines. The electric cars will soon replace the car horses on all the lines of the company with the exception of Indiana avenue, where the company must first obtain the consent of the majority of the property owners before it can change its mode of operation. After working nearly a year and a half the Chicago City Railway Company succeeded in getting through the council an omnibus ordinance, which was passed July 16. The original proposition of the company had been vetoed by Mayor Harrison and again by Mayor Hopkins. The latter suggested amendments which were accepted by the company, whereby it pays the city \$150,000 for the privilege of changing the mode of transportation. The new electric apparatus is to be placed in the power house at Fifty-first and State streets. Four 700 horse-power generators are now in position, and the Westinghouse Company will build six others. This will give the plant a 7000 horse-power. Within a month the company propose to operate the line on Halstead street, from Sixty-ninth to Root street, to Wentworth avenue, to Thirty-ninth street and to State street.

The price of flour has in most sections of the country reached the lowest point ever known in the market, following the low price of wheat; yet the baker gets the same price for his loaf as he did when wheat was nearly double the value per bushel that it is at present.

#### The Fairbanks Compound Suspension Scale.

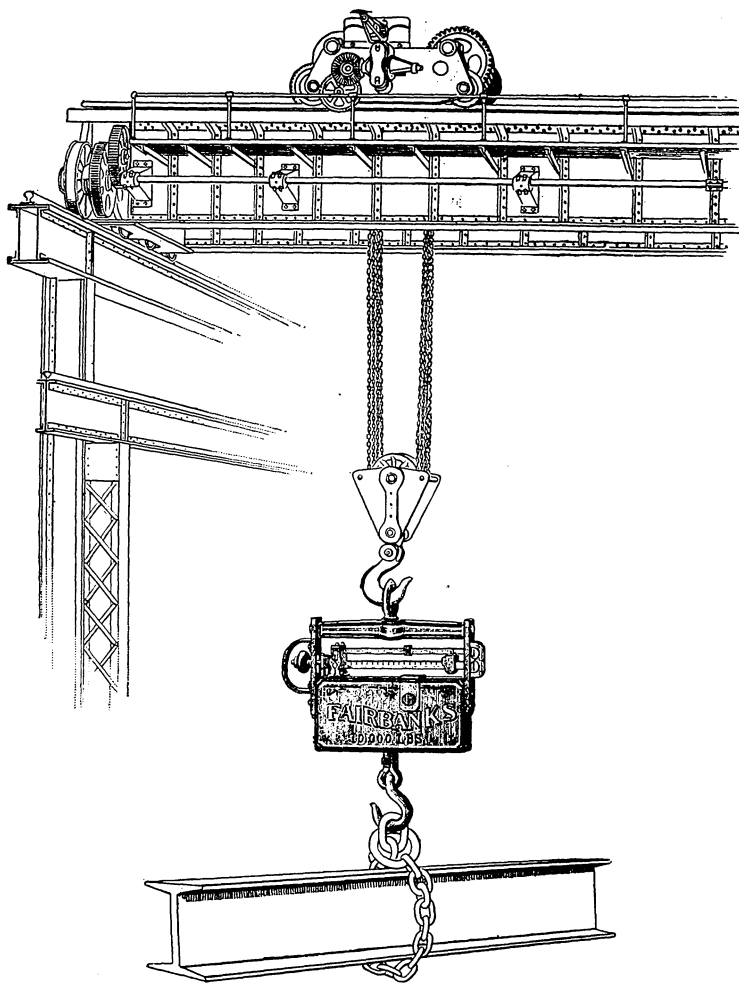
The new compound suspension scale designed by the Fairbanks Company, New York, is intended for weighing articles of all kinds in the act of being loaded, unloaded, or otherwise moved by cranes. The load is weighed as it is lifted and all the time and labor of placing it on and removing it from a platform scale are saved. As may be seen by reference to Fig. 2, which is a side view of the several levers and weighing beam, the machine is constructed upon the same compound lever principles which have been so long employed in the Fairbanks scales.

of 4, 7½ and 10 respectively, beginning at the lowest, the combined multiplication from the hook to the beam being 300. The following dimensions will give an idea of the small space occupied by these scales:

Capacity.	Size.	Weight.
6,000 pounds.	31 inches.	200 pounds.
8,000 pounds.	32 inches.	225 pounds.
10,000 pounds.	33 inches.	250 pounds.
16,000 pounds.	36 inches.	300 pounds.
23,000 pounds.	37 inches.	350 pounds.

#### Ogden & Wallace's New Warehouse.

Ogden & Wallace, who recently removed from 85-91 Elm street, New York, where they had carried on the iron and steel business successfully for



THE FAIRBANKS COMPOUND SUSPENSION SCALE.

All the bearings are of steel, tempered and hardened, and the other working parts are strongly built of the best iron and steel. All parts liable to injury are protected by an iron and steel box surrounding the levers, as shown in the perspective view. All the capacity of the scale is indicated upon the beam so that no loose weights are required. The beam is graduated to the standard of any country, as may be desired, and is made with V shaped notches, which are both more convenient for use and remain accurate longer than any other form. A large balance ball is provided to take the tare of slings, &c. The beam is divided by 5-pound marks and the machine is sensitive to a very small amount. The drawing, Fig. 2, shows that the load is transmitted from the hook to the weighing beam through three levers, which have a multiplication

over 19 years, to their new warehouse and office at the southeast corner of Houston and Greenwich streets, are now fairly settled in their new quarters. To those who were familiar with the firm's old establishment on Elm street, the new structure and its appointments will prove something of a revelation. Growth of business and the need of greater facilities, together with the fact that the proposed widening of Elm street would necessitate their removal, led to the firm's decision to seek new quarters. It was decided to locate on the West Side and because the bulk of their city business lay on that side. The location selected is accessible from all parts of the city, the Ninth Avenue Elevated station adjoining their building, a cross-town car, transferring at Broadway, passing by the door, and the Sixth, Eighth and Ninth avenue and



West street lines of horse cars passing within two blocks.

The warehouse, which is 100 x 100 feet in size, one story high, rests on a solid foundation of crushed stone and Portland cement. It has an equal frontage on Houston and Greenwich streets, and a driveway 25 feet wide extends through from street to street, forming an L. Special emphasis is laid on the fact that this driveway extends entirely through the warehouse, that it permits free access of a truck to almost every part of the store, and that a double truck can turn in any portion of it.

of the loft, making it possible to load and unload material from the street as well as from the interior.

The rack for sheet iron and steel is located on the east side of the building, and is 60 feet long, 10 feet high and 4 feet deep. There are 44 divisions, the total capacity of the rack being about 100 tons. The same construction has been followed in building this rack as employed in the bar iron rack. The firm were undecided at first whether to use wooden or iron uprights, but after due consideration it was decided that the former would fill the requirements, and

and 8 feet high. The divisions are 15 x 15 inches, and the entire rack has facilities for storing 500 tons. A loft over this rack is used for storing Norway iron hoops, &c. About 200 tons can be carried in stock. Located opposite the sheet iron rack already referred to, and running at right angles to the rack for shapes, is a rack for sheets. This is a double rack, 37 feet long, arranged for inserting and removing material from either side. It is 9 to 24 feet high and has a capacity of 150 tons. In the intervening space in the northwest corner of the warehouse are flat racks for cut scrolls, thin sheet iron and sheet steel. The divisions are formed by round iron driven into the flooring, and several hundred tons can here be accommodated. A door opening on Greenwich street permits of free access by truck to the stock located in this corner of the warehouse.

To the right on entering the warehouse by the driveway from the Houston street side is located the shipping office, and back of that the boiler for the heating system, a lavatory for the workmen and the coal bin. Two Fairbanks platform scales are provided—one located at each of the entrances, besides five Fairbanks rolling mill scales. The whole structure is abundantly lighted by seven skylights, 10 x 15 feet, the employment of wire glass giving them a noticeable appearance of neatness. Four of them are provided with a patent arrangement for ventilation. The roof at the highest point is about 27 feet above the floor, a gradual slant taking place for the purpose of drainage.

The firm carry in stock a full assortment of bar and bundle iron and steel, hoops, bands and scrolls, heavy plates and sheets, hoops for coopers' use, angles

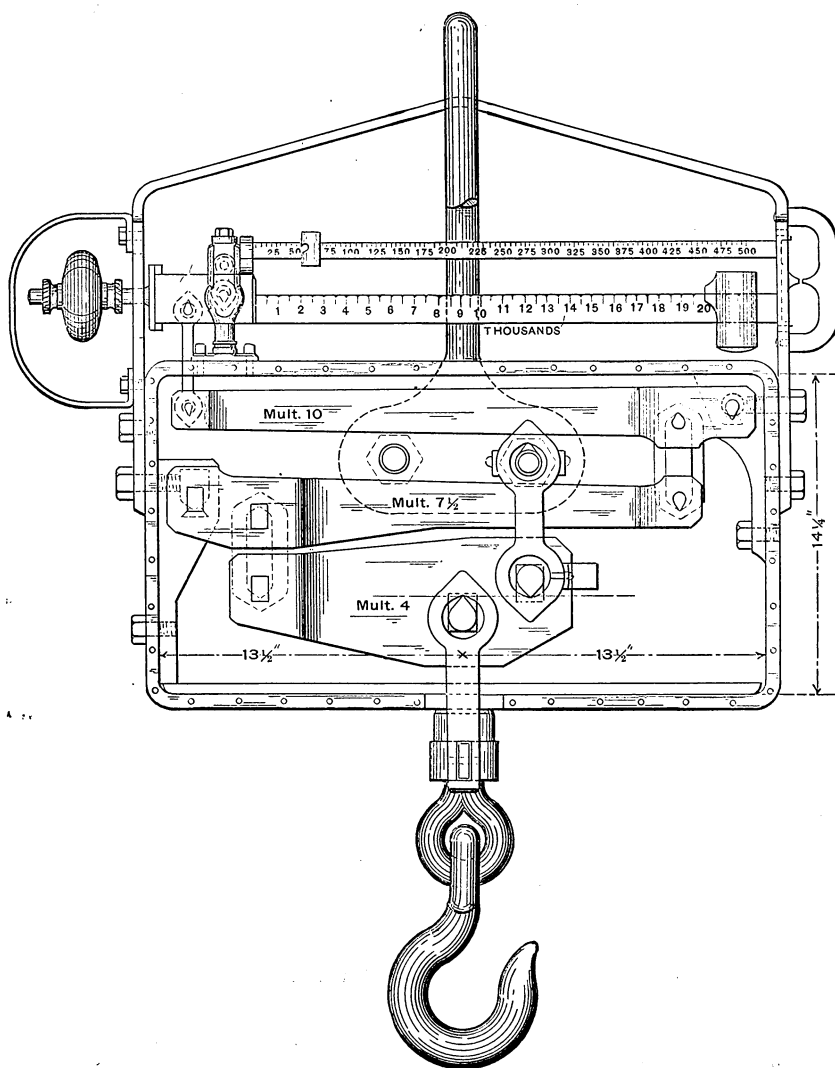


Fig. 2.—Sectional Elevation.

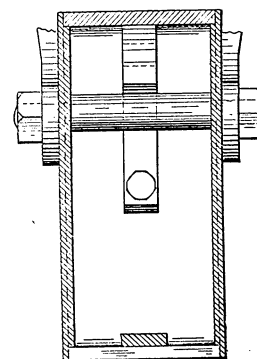


Fig. 3.—Vertical Section at Right Angles to Fig. 2.

#### THE FAIRBANKS COMPOUND SUSPENSION SCALE.

Entering the warehouse from the Greenwich street side, to the right of the driveway is a rack 100 feet long for holding bar iron. This rack, like all the other horizontal racks, is constructed of wood uprights, 8 feet high, placed 15 inches apart, with 1-inch round iron piercing them transversely at an equal distance of 15 inches for supporting the load, the depth of the rack being 18 feet. There are 450 of these divisions, each capable of holding  $3\frac{1}{2}$  to 4 tons of bar iron. This rack extends the entire length of the south side of the warehouse, the foundation being four rows of crushed stone and Portland cement with 13-inch brick walls on top. Above it is a loft for storing band, hoop and scroll iron. A door is provided at the Greenwich street end

experience has proven that they were correct in these conclusions.

Referring now to the square formed between the driveway and the street: On the Greenwich street side, extending from the driveway to the Houston street side and along Houston street for 36 feet, and then parallel with Greenwich street for 60 feet, are bins 5 feet deep for accommodating the various sizes of rods and other bundle iron and steel. These bins are formed by 1-inch round iron, projecting 5 feet from a wood cross post secured to the walls. There are 60 of these bins, with a combined capacity of about 500 tons.

Directly across the driveway from and facing the bar iron rack is a center rack for shapes. This rack is 35 feet long and 22 feet deep, closed at the end,

and tees, channels and beams of iron and steel, Norway iron, shafting iron and steel, rods, horseshoe iron, cast and machinery steel and grooved iron. The aggregate stock usually carried is about 2000 tons. With this amount of stock in place, it is seen that the firm have made ample provisions for still further expansion of business. The systematic arrangement of the stock and the amount of clear floor space which can be used for the hasty accumulation of stock prior to stacking it in place are striking features of the warehouse.

The office, which is located in a second story on the Houston street side of the warehouse, is a still greater departure from the old order of things. The entrance is on Houston street, and opens into a spacious vestibule finished

in solid oak. Broad stairs lead up to the first landing, where they turn before reaching the office proper. Opening off this landing is the lavatory for the office force. The staircase, like the vestibule, is finished in solid oak. The office itself is 60 x 33 feet, with ceiling 12 feet high. The attention is first drawn to the eastern end of the office, where a most effective attempt at ornamentation has been made. This entire end of the office, from floor to ceiling, has been finished in quartered oak panels, the center being occupied by a large fire place built of Pompeian brick with black iron trimmings. From the fire place the wall on either side gradually inclines outward, permitting the safe to be set into the space thus made on one side, and of coat rooms and telephone closet on the other side, besides adding to the attractiveness of the arrangement. The space above these and above the fire place has been util-

ized for closets, but so cleverly conceived as not to detract from the artistic beauty of the work. The floor is of hard wood, polished. There are seven roll top desks, and three high desks for cashier, bookkeepers, &c., all made to order and finished in the same quality of oak as elsewhere employed throughout the office. A handsome private office occupies the southwest corner. The office is well ventilated and lighted with both gas and electric lights, and provided with the Boynton system of hot water circulation. The entire effect is very rich.

The structure and its arrangements are after Messrs. Ogden & Wallace's own designs, and embody the features that have been found desirable during 36 years of experience. It is safe to say that they could not be improved upon, and that the establishment throughout embodies the most modern conveniences for carrying on their business in an expeditious and economical manner.

A dispatch from Madrid states that a royal decree, issued on August 30, abrogates the customs arrangement of

#### The McMyler Machine for Coaling Lake Steamers.

Next to the traffic in iron ore between the mining regions of Lake Superior

were delayed two to four days in loading and with eight or ten men shoveling into buckets from a car 3 feet deep, and not taking probably more than 20 pounds to a shovelful, there was still the disadvantage of separating the coal and breakage.

The effort, therefore, has been to secure dispatch for vessels approaching that obtained in the ore trade, where ships of 3000 to 3500 tons are loaded in a few hours and at the same time avoid loss in the commercial value of the coal by overcoming as far as possible the breakage referred to. A machine that, it is claimed, meets these requirements has been constructed and is illustrated herewith. From an engineering standpoint it is a very novel affair, but it has been given sufficient trial in actual service at Ashtabula, Ohio, to demonstrate its practicability. Patents on the machines are controlled by the McMyler Car Dumping Machine Company of

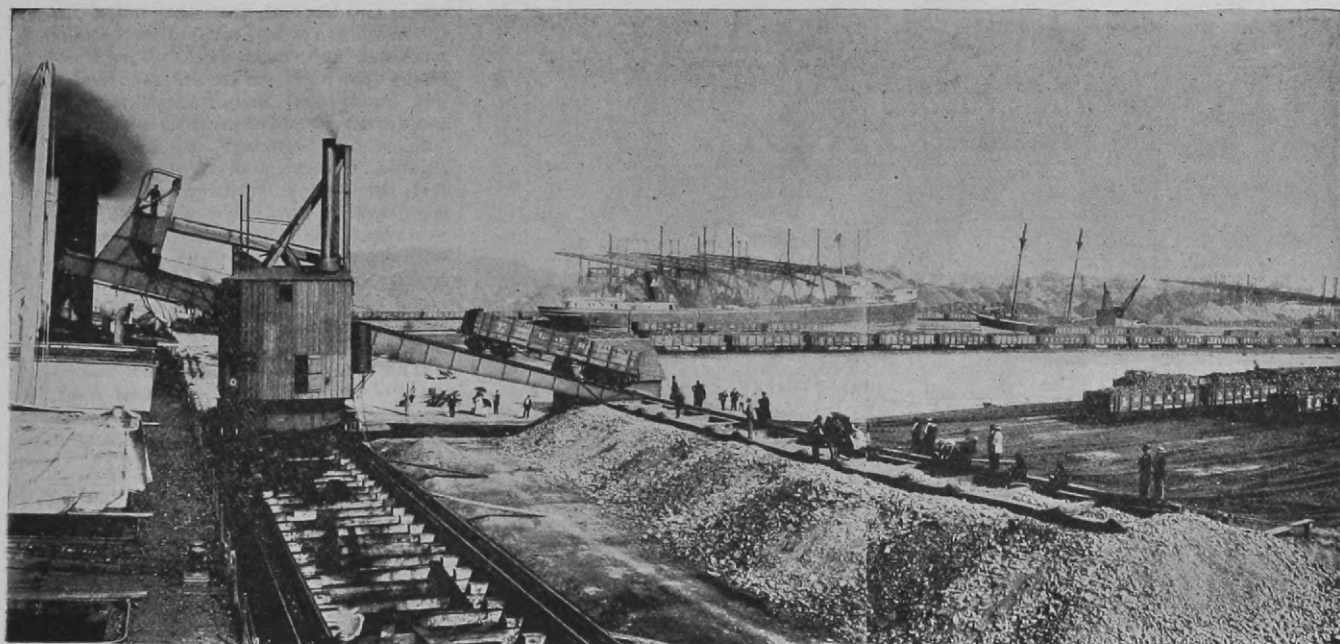


Fig. 1.—View Showing Car Being Drawn on the Tilting Bridge.

#### THE McMYLER MACHINE FOR COALING LAKE STEAMERS.

and the furnace districts of Illinois, Ohio, and Pennsylvania, the movement of bituminous coal from Lake Erie ports to the Northwest is the most important item of Lake commerce. For several years past shipments of coal from the Pittsburgh, Hocking Valley and West Virginia districts have averaged about 3,000,000 tons each season. This coal is of a high grade, suitable for fuel and steam purposes and for the manufacture of gas and coke, and shippers have tried various methods of loading it into vessels without damage from breakage.

As far back as 20 years ago attempts were made to handle coal on the lakes by means of shutes, and on the Cleveland docks of what is now the Big Four Railway as much as \$65,000 was expended on a single plant that had to be entirely abandoned soon afterward, on account of damage to the coal in handling it. With the advent of big steel steamers and wooden boats of largely increased capacity, rotary derricks, handling first buckets of ordinary size, and later on buckets of 5 tons' capacity, were introduced into the trade, but even with these the largest vessels

Cleveland, Ohio, a new corporation, and the first of them was built by the McMyler Mfg. Company for Pickands, Mather & Co., who are the Cleveland representatives of the Minnesota Iron Company. Instead of the old system of derricks and buckets, this machine takes up a loaded car of about 23 tons' capacity and dumps its contents into the hold of a vessel in a manner that avoids practically any fall of the coal, as the car is carried loaded to the mouth of hatch and the entire load allowed to slide out in a concentrated mass through an ingeniously arranged chute. Of course, a car of 50 tons' capacity could be handled in the same way and the efficiency of the machine thereby greatly increased. Several records as high as 15 cars of 23 tons each—345 tons—unloaded in one hour, have been made with the apparatus and steamers ranging in capacity from 2000 to 3100 tons have been loaded in 8 to 12 hours.

The machine is entirely self contained and portable, having the rotatable features of a revolving derrick, with the addition of the girder or bridge, by means of which the entire car of coal, instead of a loaded bucket, is taken up

and discharged. All trestle work is avoided and there is nothing complicated or expensive about the apparatus. Aside from the machine itself the only expense is that connected with arrangement of the surface railway tracks. Viewing the machine from a mechanical standpoint, its elements may be described as a bridge of two plate girders turning on trunnions near the river or dock end of the bridge. These trunnions are carried on the frame work of the house, which is in turn carried on about 100 12-inch wheels arranged in a circle after the manner of a drawbridge. The circular track on which these wheels move is supported through heavy plate girder frame work by 16 large car wheels moving on four tracks, the outer ones

brake for it. From an accumulator having at one end a hydraulic piston and at the other end a steam piston ten times the area of the hydraulic piston is taken the pressure to operate the clutches for pumping, hoisting and driving laterally, and also the brake controlling the winding drum that pulls the car up the incline.

In operation, the vessels being placed so that the hatches are opposite the tracks, or nearly so, the machine is moved to the hatch which it is desired to load into. The steel cable, size 1½ inches, is hooked into the drawhead of the car, and the car pulled up to the upper or shorter end of the bridge, which is so constructed as to form a bumper, against which the end of the

of loaded cars, or in permitting of trimming the cargo. Through the latter operation a great saving in time is gained, as occasion for shifting a vessel while the work of loading goes on is very rare. Not only can the machine be moved laterally in either direction with a car on the bridge or platform, but it may be swung at the same time to avoid spars or any other obstructions on the vessel. One of the best features of the machine is its adaptability to the kind of railway car in general use in the bituminous coal trade. The only charge required is that of fitting sliding end boards in the cars at a trifling cost. Immediately upon preparation being made for the erection of this first machine at Ashtabula, the management

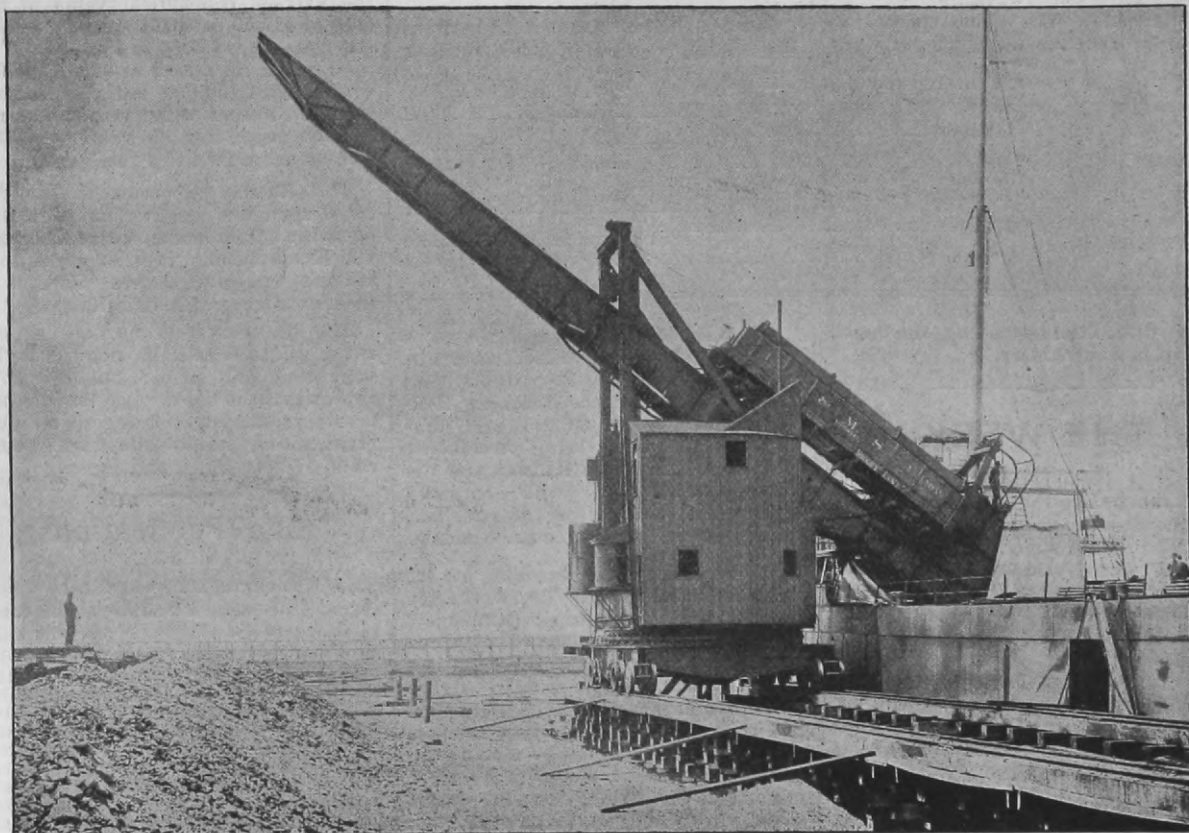


Fig. 2.—View Showing Bridge Tilted to Dump the Car.

#### THE McMYLER MACHINE FOR COALING LAKE STEAMERS.

of which are 24 feet apart. Back of the machine and its docks are 16 double lines of railway tracks, shown at the right in Fig. 1, which are for loaded and unloaded cars, and which are spaced about the same as the hatches of vessels and perpendicular to the line of the dock. The power is furnished by a pair of suitable engines, which control the hydraulic power, and all operating parts are controlled by friction clutches, requiring but one operator to handle the entire machine and only four men in all engaged in connection with the plant. The other three are a fireman, a man employed on the bridge and a man to attach the cable to the drawhead of the car.

An hydraulic ram of 18½ inches diameter, mounted on trunnions tilts the bridge (to position shown in Fig. 2), which is so balanced that it rights itself, the ram forming an effective

car rests when tilted. The end board being withdrawn automatically through the tilting operation, the coal flows out through a discharging chute and is concentrated in a telescopic trough or spout, which, at the first flow of the coal, may be lowered to within a few feet of the bottom of the vessel, when the work of loading begins at any of the several hatches, or to the surface of the coal itself after the bottom of the vessel is covered. In double decked vessels this chute may be lowered to the between deck combings. After the load is discharged the bridge is tilted back, the cable on the end board detached, the car allowed to run down and off the incline on to the track provided for "empties," a loaded car again taken up, and so the operation continues, the machine moving from one set of tracks to another, and from one hatch to another, as may be required by supplies

of the Lake Shore and Pittsburgh & Lake Erie Railways, the two coal lines running into that port, caused 1000 cars to be fitted with sliding end boards, and work has been started on 1000 more of the same kind.

The capacity of the surface track plant, shown in Fig. 1, and from which cars are moved on to the platform of the machine by a locomotive constantly in attendance, is 140 cars, or about 3300 tons. Of course the number of sets of surface tracks for loaded and unloaded cars depends entirely upon the number of cars it is desired the plant shall handle, and as the entire transferring apparatus is arranged to move along a dock line it can therefore be made to accommodate any desired number of tracks and length of dock.

The work done by the machine during the few weeks that it has been in actual service is shown by the following



table, in the consideration of which, especially as regards the first cargoes loaded, allowance must be made for the few exceptions, the sugar works not only yield no profits, but do not meet expenses, including interest.

Date.	Vessel.	Tons loaded.	Time loading.	
		Tons.	Hours.	Minutes.
June 27	Steamer "Maruba"	1,145	8	45
" 29	" "Yuma"	1,819	8	45
July 2	" "Iosco"	2,180	13	45
" 6	" "Matoa"	1,238	5	30
" 6	" "M. M. Drake"	1,535	13	30
" 7	" "Maryland"	1,091	8	45
" 16	" "K. J. Hackett"	2,195	12	30
" 17	" "Choctaw"	3,083	21	45
" 18	" "Kearsarge"	2,846	16	30
" 20	Schooner "Allegheny"	1,062	6	20
" 26	Steamer "Pontiac"	2,466	11	45
" 27	" "Maritana"	2,497	10	30
" 29	" "Kearsarge"	8,283	16	15
August 1	" "Choctaw"	2,228	8	15
" 2	" "Pease"	780	8	30
" 3	" "Manola"	1,421	5	30
" 5	" "Matoa"	2,511	10	..
" 7	" "J. C. Gilchrist"	1,988	9	45
" 8	" "Yuma"	3,259	12	..
" 9	" "Manhattan"	1,858	8	45
" 11	" "Wadena"	1,794	10	15
" 13	" "Kearsarge"	3,226	12	..
" 14	" "Manola"	2,573	9	45
" 15	" "W. H. Gratwick"	1,789	7	..
" 15	" "John Mitchell"	2,187	9	30
Totals.....		52,096	271	50
August 21	" "Manchester"	2,120	8	30
" 21	" "Neshoto"	1,854	7	..
" 22	" "Kearsarge"	8,724	13	20
Totals.....		7,693	28	50
Grand totals.....		59,794	300	40

usual difficulties attending the handling of new machinery.

THE WEEK.

As illustrating the present excessive freight rates for goods exported to Central and South America a Pittsburgh journal records that a narrow gauge locomotive, bought at that city for \$3575, was recently delivered at Samaca, Colombia, for \$3595, with \$10,904 charges against it. The iron work for four cars, costing \$494.48, reached their destination with a bill of \$1610. A turbine wheel worth \$708 cost when carried within 150 miles of Samaca \$3760.

The anthracite coal sales agents met in New York City on August 29 and decided to fix the output for September at 2,500,000 tons. No action as to prices was taken.

It is stated that arrangements have been made to ship 100,000 tons of bituminous coal this fall to Brazil from Philadelphia.

The Swiss Federal Council has approved the scheme for a Jura-Simplon railway tunnel through the Simplon, to cost \$10,900,000. The plan is to be submitted for the approval of the Italian Government.

During the first six months after the opening of the New Corinth Canal the receipts little more than balanced the expenditure.

In a report sent to the State Department by United States Consul-General Williams, at Havana, that official states that no previous period in the history of the Cuban sugar industry has been so disastrous as that beginning in August, 1893. The planters suffered heavy losses, although the quantity of sugar produced was the largest recorded on the island. A general report on the industry, which is to be laid before the Spanish Cortes at the next session, calls for remedial legislation. It asserts that, with very

The railroad journals state that steps are being taken for a close traffic alliance between the Big Four, the Chesapeake & Ohio and the Southern Railway Company. It is also said that arrangements are being conducted whereby the Southern Railway and the Chesapeake & Ohio will eventually agree to stop the cutting of rates and will reduce expenses at common points.

Transatlantic record breaking has set in with great severity. Two weeks ago the Cunard steamship "Campania" broke the westward record by three hours, and on her eastward voyage last week the same vessel accomplished the passage from Sandy Hook to Queenstown in 1 hour 13 minutes less than the previous best time—her own—making the eastward record 5 days, 12 hours, 7 minutes. On Friday last her sister vessel, the "Lucania," arrived in New York in 5 days, 8 hours, 35 minutes from Queenstown, thus snatching the westward record from the "Campania" and making another step toward the predicted five days' voyage.

Andrew Carnegie has an article in the September *Contemporary Review* on labor in America, in which he says that the workingman can live for less in the United States if he chooses than in Great Britain, provided that he will live as frugally. A pound expended judiciously here would, he thinks, afford the workingman's family more comfort than would the same amount spent in England. Consequently Mr. Carnegie concludes that the argument that wages must be higher in America is fallacious.

At San Antonio, Texas, a company have been organized with a capital of \$1,000,000, under the name of the Rio Grande Valley Canal & Irrigation Company, to establish a system of irrigating canals in the lower border counties of Texas. Several hundred thousand acres of arid lands are to be brought into cultivation, the water being drawn from the Rio Grande.

Forest fires, caused by the heat and drought, have devastated large tracts in

Northern Michigan and Wisconsin. The losses to the lumbermen aggregate many millions of dollars. Several towns and villages have been completely wiped out, and much suffering is felt by the people.

English capitalists are said to have bought large tracts of coal lands in Southern Colorado, which are to be developed immediately.

Heavy rains have damaged Alabama's cotton crop 20 to 25 per cent.

The report of the secretary of the New Orleans Cotton Exchange, on the cotton crop for 1893-94, places the total yield at 7,549,879 bales, an increase of 849,452 bales over that of last season. The largest part of the gain was in Alabama, Georgia, Florida and North Carolina. Secretary Hester puts the average commercial value of the crop at \$37.50 per bale, against \$42.50 last year and \$37.50 in 1891-92. The total value he places at \$283,118,000, against \$284,150,000 last year, so that while the output of last year was nearly 850,000 bales less its value was \$1,032,000 more than this year's crop.

The Russian Government has decided upon the construction of a line of railway from Samarcand to Khokand via Khodschend. It is expected that the line will give a great impetus to the cotton trade of Asiatic Russia.

The war news from the East is puzzling. Both sides claim victories at the same time and place; but it would appear that the fighting, so far, has not been very extensive. Energetic military preparations, meanwhile, are being made by both China and Japan.

Trade Publications.

ED. WERTHEIM, 207 and 209 Lake street, Chicago, has issued a most interesting catalogue of asbestos products under the title of "German Asbestos Goods." Those who made a careful study of the exhibits at the recent World's Fair in Chicago will remember a very fine display of asbestos goods in the German section of Machinery Hall by Louis Wertheim of Frankfort-on-Main. This was the most complete collection of raw and manufactured asbestos ever made, showing not only the remarkable character of this mineral, but admirable ingenuity in adapting it to a great variety of purposes. Louis Wertheim was a pioneer in this line of manufacturing industries, beginning the mining of asbestos in Italy in 1867, and now controlling mines in that country and in Canada, whence he obtains the raw material for his factory at Frankfort. Ed. Wertheim is the son of Louis and is now in charge of the American agency which has been established in Chicago. The catalogue comprises 75 pages, neatly printed and illustrated and handsomely bound. It sets forth full details concerning the manufacture of asbestos and treats comprehensively of the products made, such as piston packing, gum core packing, millboard, gaskets, sheeting, tape packing, pipe and boiler covering, belting, rope, building paper, devices for chemists' use, electrical supplies, &c.

THE AMERICAN TUBE WORKS of Boston, New York, Philadelphia and Chicago, have issued a book giving the weights, sizes, &c., of their seamless drawn brass and copper tubes and pipe.

The London *Iron and Steel Trades Journal* contains the following item: "Some important news reaches us from Russia. It is nothing less than that an American syndicate, in which the well-known Baldwin Locomotive Works of Philadelphia are said to be interested, is about to establish works on the River Volga for the production of steel rails and locomotives."

The Iron Age

New York, Thursday, September 6, 1894.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.  
CHAS. KIRCHHOFF, - - EDITOR.  
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.  
RICHARD R. WILLIAMS, - HARDWARE EDITOR.  
JOHN S. KING, - - - BUSINESS MANAGER.

The Pig Iron Situation at Chicago

In no part of the country have the developments in the foundry pig iron trade been more interesting during the current year than at Chicago. This arises from the fact that Southern pig iron makers have had their hold on that market seriously shaken, if not permanently weakened. Time only can determine whether the conditions which are now established shall continue, but the local producers are very confident that the revolution which has been effected will not go backward. They have for years claimed that whenever a supreme struggle would be made for the control of the Northwestern foundry trade their Southern competitors would be obliged to retire from the field. The struggle was postponed by the long continued heavy local demand for pig iron for the production of steel rails and other steel products. It was often necessary to withdraw all the local furnaces entirely from the foundry trade to keep the steel works supplied. Under such circumstances foundry pig iron was not a prominent product of the Chicago group of furnaces, and although the output grew its growth was spasmodic, while the local trade in Southern pig iron flourished and many foundries made it the chief part of their mixture. The Southern furnace companies managed their affairs well, reducing cost and lowering prices from time to time in order to maintain their hold on the expanding foundry trade of the Northwest.

At the beginning of the present year there was an advantage of from 75 cents to \$1 per ton in favor of the Southern iron maker in the Chicago market. Prices of local iron had been reduced lower than anybody in the trade had deemed they were likely to go, and yet Southern iron was delivered to consumers at a still lower rate. The superb manner in which Southern furnace men met the necessities of the times and conquered costs extorted admiration from their Northern rivals, who had long before thought that the bottom limit of Southern costs had certainly been touched. But the stagnation in the steel rail trade and the diminished demand for other finished products compelled the Northern furnaces to look more carefully after their business in foundry iron, and they grasped the opportunity afforded by the greatly reduced prices of ore and coke. In February the margin between Northern and Southern iron in the Chicago market was consider-

ably narrowed, and in March it was completely wiped out. In April the Southern railroad lines came to the relief of the Southern companies by reducing freight rates to a figure much lower than anything previously known. But it was of no avail, as the Northern furnaces made prices to correspond. In April, May and June, the contest was fought out and the Northern makers won, taking every large contract that came in sight at prices which Southern furnace companies were totally unable to meet. At this time the Southern makers were badly handicapped by the strike of their coal miners. The Northern furnaces suffered to some extent by the strike among the Connellsville coke workers, but it had no effect on their prices, which were forced even lower than necessary by competition for business between the local iron producers. Thus a very low level was maintained in June, July and August, notwithstanding an appreciation in Southern prices by the partial restoration of freight rates and the reduction in the number of active furnaces. How greatly the consumers of pig iron in the Northwest have been benefited by this aggressiveness of the Chicago producers is indicated in the table below, in which the course of quotations is given in several of the leading markets of the country from month to month. The quotations on Chicago local iron, it must be said, do not show the lowest figures made on large contracts, but those given for Southern iron at Chicago are extremely close to actual prices made on any quantity. No. 2 foundry pig iron is taken as the basis of comparison, because that grade of iron is in the largest demand in the Western foundry trade.

to make such a mixture to secure best results. They say further that if this is really the case, a good market for Northern iron should be found along the Ohio River and south of it, where there are numbers of foundrymen who presumably are as anxious to make good castings as their brethren in the vicinity of Chicago. It is a poor rule that won't work both ways. Without disparagement to either party in this contest over the control of an important market, it is our opinion that price is the most important factor in determining the use of various kinds of pig iron when all are of recognized good quality. The foundrymen of the present day are not wedded firmly to special brands, as was the case not many years since, but speedily transfer their affections to other irons which can be had at a cheaper rate.

Probably the most important feature of this interesting matter has been reserved for treatment last. On reference to the table of quotations it will be seen that Chicago is the cheapest market for foundry iron in the large consuming centers north of the immediate vicinity of the Ohio River. If No. 2 foundry iron has really been sold at \$9 per ton, as stated by some members of the trade, Chicago foundrymen are enjoying greater advantages in cheap raw material than even their colleagues on the Ohio River. This is a remarkable change in the condition of Chicago as an iron center. Only a few years since the price of iron in the metropolis of the West was the price at some producing point East or South with freight added. In cutting loose from such influences and establishing an independent basis of prices, the Chicago iron makers have laid a

Quotations of No. 2 Foundry.

1894.	Philadelphia.	Pittsburgh.	Cincinnati.	Chicago.	
				Southern.	Local.
January .....	\$13.0 @ \$13.25	\$11.25	\$10.75	\$11.75	\$12.50
February .....	12.50 @ 13.25	10.75	10.25 @ 10.50	11.50	11.75
March .....	12.25 @ 12.75	10.50	9.75 @ 10.00	11.25	11.25
April .....	10.75 @ 11.75	10.25	9.25	10.25	10.50
May .....	10.75 @ 11.25	10.25 @ 10.50	9.25	10.00	10.50
June .....	10.75 @ 11.00	10.75	9.25 @ 9.50	10.25	10.50
July .....	10.75 @ 11.50	10.75	9.50	10.50	10.00
August .....	10.75 @ 11.80	10.75	9.75	10.75	10.00

The sellers of Southern pig iron, however, have not given up the contest in the Chicago market, but are making a strong effort to hold at least a part of their trade. This will be seen from the following statement extracted from a recent circular issued by a very prominent house :

It is a fact that Southern irons cannot be dropped advantageously, as repeated experiments have shown that maximum strength cannot be obtained where Northern iron is used alone. Large consumers who have experimented thoroughly have found that the best results have been obtained from using both Northern and Southern irons together.

The accuracy of such experiments is challenged by the local pig iron makers, who claim that their customers are finding that it is unnecessary

new foundation for the great industries of that city and vicinity which will be of enormous advantage in future trade movements.

It would hardly be expected that any complaints of scarcity of scrap would be heard at this time. Accumulations of all kinds of old material were but recently understood to be immense. And yet Western rolling mills are encountering a decided shortage in certain kinds. They are offered an abundance of high grade wrought scrap, but the supply of busheling or boiling scrap has been exhausted. Borings and turnings are largely used for this purpose. These are produced by machine shops, general factories, railroad shops, &c., which have been running light for the

past year and therefore have made but little scrap. Mills making bar iron from half wroughtscrap and half muck or scrap bar are in a quandary. The price of bar iron is so low that it will not pay to purchase pig iron and puddle it. If this proves to be absolutely necessary, the price of bar iron will be advanced to correspond. But this shortage is expected to be only temporary, as factories and shops are getting into operation more generally and the supply of small scrap will increase.

#### Calcined Lime in the Blast Furnace.

The principal paper read at the Brussels meeting of the Iron and Steel Institute was that of Sir Lowthian Bell, in which he dealt in his well-known method with the question of the advantages obtainable by the use of calcined limestone as a flux in the blast furnace in the place of raw stone. As usual his calculations are very elaborate, but the data submitted seem hardly to justify the conclusions drawn from them. The records cover the work of two furnaces 80 feet high, with a capacity of 60,000 cubic feet. Both furnaces were run for 19 weeks on raw limestone, and 17 weeks on calcined stone, and finally they were operated contemporaneously for 13 weeks, one on raw and the other on calcined stone. In a condensed form the results were as follows:

No. 11 Furnace.		Raw.	Cal- cined.
Coke consumption, hundred-weight per ton pig.....	21.82	20.14	
Flux hundredweight per ton pig.....	11.76	8.57	
Calcined ironstone, hundred-weight per ton pig.....	47.22	47.40	
Product, tons per week.....	451	451	
Average grade, tons per week..	3.3	3.3	

No. 12 Furnace.		Raw.	Cal- cined.
Coke consumption, hundred-weight per ton pig.....	22.01	20.09	
Flux hundredweight per ton pig.....	11.87	8.62	
Calcined ironstone, hundred-weight per ton pig.....	47.34	47.34	
Product, tons per week.....	459	497	
Average grade, tons per week..	3.3	3.3	

No. 11 Raw. No. 12 Calcined.		Raw.	Cal- cined.
Coke consumption, hundred-weight per ton pig.....	21.79	19.76	
Flux hundredweight per ton pig.....	11.47	8.51	
Calcined ironstone, hundred-weight per ton pig.....	46.31	47.47	
Products, tons per week.....	406	536	
Average grade, tons per week..	3.5	3.5	

These figures show that the fuel consumption in the furnace was reduced 1.87 units on an average, or 8.55 per cent. Sir Lowthian Bell states that as against this saving there is the coal used for calcining the limestone, which was 8.33 per ton of iron, so that "as a matter of commercial difference there is not much to choose between the coke in the furnace and coal in the kiln." He does not appear to attach any importance to the increase in make, since he does not even refer to that feature. We imagine that American furnacemen would show more interest in it.

However, the weak point in the whole work done, and which seems to vitiate it entirely, is that pointed out by Charles Cochrane, the well-known furnace manager, in a written contri-

bution to the discussion. What Sir Lowthian Bell calls "caustic lime" used in the experiments seems very far removed from what would ordinarily be so termed. He prints a number of analyses which, so far as we understand the text, refer to the carbonic acid contents of the calcined stone used in this series of experiments. These analyses show that there remained in the "caustic lime" from 28.66 to 35.45 per cent. of carbonic acid. Since pure lime contains 44 per cent., the calcining does not appear to have been very good, to say the least. Sir Lowthian Bell has not replied as yet to this point of Charles Cochrane's criticism of his paper. Unless an adequate explanation is offered, blast furnacemen will throw out the whole series of experiments as practically valueless.

The First National Bank of Chicago, which is one of the great financial institutions of America, recently sent out a circular letter to its correspondents in Iowa, Nebraska, Kansas and the Dakotas, asking for correct information on crop prospects. This investigation was undertaken on account of the conflicting reports in circulation on the extent of the damage done by drought and hot winds in those States. The correspondents are country bankers, who are an exceptionally intelligent class of men. Their reports show that there has been a total failure of crops in Western Kansas and Nebraska only, but that Eastern Kansas and Nebraska and the Dakotas are in fair shape, while Iowa is in good condition in consideration of the very gloomy prospects which have been portrayed by some of the crop reporting agencies. Crop reports of late years have become generally discredited, as they have been shown to persistently understate the yield. If they do so in good years, they are likely to err much more flagrantly in the same direction with such a good basis as a very hot, dry season. Independent investigations of the character instituted by the Chicago bank seem to be almost necessary by large commercial houses, whose successful management depends upon correct information of the condition of important sections of the country.

H. E. Collins & Co., Pittsburgh, general sales agents in the United States for the sale of the Cahall water tube boilers, made by the Aultman & Taylor Machinery Company, Mansfield, Ohio, have closed a contract for 525 horsepower of this type of boiler to be placed in the new steel plant now under erection by the St. Louis Stamping Company, St. Louis, Mo.

Rogers, Brown & Co., the well-known pig iron merchants, advise us that quite a number of instances have been reported to them lately of a young man traveling through Michigan claiming to be connected with the Buffalo office of the firm. He states that he is short of funds and wishes to borrow enough to pay his way home. Rogers, Brown & Co. pronounce this person a fraud.

## CORRESPONDENCE.

### Magnetic Concentration at Ogden.

To the Editor: An item in the current number of *The Iron Age*, for August 30, 1894, p. 346, refers to the contemplated early resumption of operations at Thomas A. Edison's magnetic ore concentrating works at Ogden, N. J. The article in question contains certain data relating to the efficiency which it is expected will be realized in the operation of the improved plant, now, and for a long time past, under construction at that place, and, in view of the general interest among mine owners in magnetic ore concentration and the important relation which it undoubtedly bears to the future progress of iron and steel manufacture in the Eastern States, the publicity thus given to these data renders them a proper subject of inquiry and criticism.

It is stated that plans are laid out to mine 5000 tons per day of crude ore carrying 27 per cent. of iron from which it is expected to obtain a product of 1700 tons of briquetted concentrates, and the tailings are to be brought down to 1 per cent. iron. It is not stated what percentage of the briquetted product is to consist of cementing material nor to what per cent. iron the concentrates are to be raised, and this omission is to be regretted, since information upon these points would possess considerable interest to mine owners who are now anxiously looking about for means to improve the quality of and more economically produce and prepare their ores for the market. From well-known facts, however, respecting the mineralization of the Ogden ore, it may be assumed that the concentrates must carry at least 65 per cent. iron to fall within the Bessemer classification; and, as the relative weight of rosin used in briquetting the ore would be small, although adding to the apparent efficiency of the method of concentration, it may be passed over so far as it may have a bearing upon the statement of the quantity of concentrates which may be produced from a given quantity of the Ogden ore; moreover, as the rosin would possess a certain fuel value its presence, at present prices for ore as compared with coke and coal, would hardly be objected to by the furnace manager, although, from the standpoint of the mine owner, it might, for that very reason, be desirable to dispense with its use in this connection. The apparent necessity for its use at Ogden seems to be an incident of the extremely fine pulverization to which Mr. Edison resorts in the preparation of his ore for concentration.

A casual consideration of the data given discloses certain irreconcilable conditions which are of such importance as to deserve a little more careful scrutiny. The statement that 5000 tons of crude ore, carrying 27 per cent. iron, are expected to produce 1700 tons of concentrates, with 1 per cent. iron in the tailings, suggests three different conclusions.

1. If no more than 1700 tons of concentrates of 65 per cent. grade can be made from 5000 tons of crude then it will require  $\frac{5000}{1700} = 2.94$  tons to make 1 ton of concentrate and 1.94 tons of tailings, and from this we obtain the equation  $\frac{1.94 \times 1 + 65}{2.94} = 22.77$  per cent. iron in the crude, instead of 27



per cent., which would indicate an inaccurate estimate of the average per cent. iron contained in the crude ore, or a neglected loss.

2. As an alternative, it may be assumed that the average per cent. iron in the crude has been definitely ascertained and correctly stated, as well as the prospective loss in tailings (27 per cent. in the crude and 1 per cent. in tailings), and the concentrates are to be of 65 per cent. grade, we then obtain

the equation  $\frac{65 - 1}{27 - 1} = 2.46$  tons of crude to make 1 ton of concentrate,

and  $\frac{5000}{2.46} = 2.032$  tons of concentrates from 5000 tons of crude, but this theoretically possible result seems to be beyond Mr. Edison's expectations, which is to be regretted, since the difference in value of the daily product of the mine, as between 1700 and 2032 tons of concentrates—332 tons at, say, \$2.75 per ton—would amount to the comfortable sum of \$913.

3. There remains, however, still another view of the matter. Assuming that the crude contains an average of 27 per cent. iron, as stated, and 1700 tons of 65 per cent. concentrate will be made from 5000 tons of crude (2.94 tons of crude to make 1 ton of concentrate and 1.94 tons of tailings), we then have the equation  $\frac{2.94 \times 27 - 65}{1.94} = 7.41$

per cent. iron in the tailings—the actual commercial efficiency of the operation, according to this application of given data, being  $\frac{65}{2.94 \times 27} = 72.72$

per cent. of the iron in crude saved in concentrate, and 27.28 per cent. lost in tailings. This would indicate an inefficient method or means of concentration, which ought to be corrected and this waste turned to account of profit, as pointed out under our second heading—the question of the practical success or failure of the enterprise being, very likely, involved in the considerations here pointed out.

#### CONCENTRATION.

#### PERSONAL.

Frank B. Knight, assistant engineer of the Lidgerwood Mfg. Company, New York, now represents the cableway interests of the company at Chicago. He will be located in the Old Colony Building.

D. N. Barker has been appointed to succeed the late Joseph M. Larimer as manager of the Chicago branch of Jones & Loughlins, Limited. Mr. Barker will need no introduction to the patrons of the house, having been connected with it for many years in a position of responsibility.

Thos. M. Eynon of the Eynon Evans Mfg. Company, Philadelphia; James C. Brooks of the Southwark Foundry & Machine Company, Philadelphia, and Professor Houston, late of the Thomson-Houston Electric Company, have been appointed a civil service board of examiners of elevators for Philadelphia.

Kennerley Bryan has severed his connection as engineer with Otis Brothers & Co. of New York, and has become associated with the Buffalo Engineering Company of Buffalo, N. Y. Mr. Bryan is retained by Winslow Bros. Elevator Company of Chicago as consulting engineer.

Among the Americans present at the Belgian meeting of the Iron and Steel

Institute were Dr. Hill Howe of Boston, Julian Kennedy, W. McConway, G. W. McMurtry of Pittsburgh and C. H. Morgan of the Morgan Construction Company, Worcester, Mass., and S. T. Wellman of Thurlow, Pa.

O. M. Hartzell of Pittsburgh returned last week from a six weeks' visit to Europe.

### Washington News.

(From our Regular Correspondent.)

WASHINGTON, D. C., September 4, 1894.

#### The Midvale Plate.

The preliminary report on the test of the cast steel plate, unwrought, presented by the Midvale Steel Company for trial at Sandy Hook, which took place last Friday, has been received and makes a decidedly unfavorable showing. The plate was 10½ inches thick, and was fired at by an 8-inch gun with an armor piercing shell.

The programme was arranged for three shots. The first shot, with a velocity of 1552 foot-seconds, made three large cracks and penetrated the backing. The second shot went through without impairing the projectile and practically destroyed the plate. The third shot was not fired. This plate was specially treated without chrome in it. The Midvale Company now propose to try a plate worked under the rolls or hammer in order to see what effect that treatment will have in the direction of securing hardness and toughness by simpler processes than those now in vogue.

#### Tests of New Guns.

The Crozier wire wound gun, manufactured at the Watervliet Arsenal, is being tested from a Buffington-Crozier 10 inch disappearing carriage as a test of both gun and carriage. The shots already fired have been quite satisfactory. The Brown segmental gun, disabled in the course of firing, is being dismantled with a view to improvements gained by experience. The tests of pneumatic and dynamite guns and projectiles which have been going on for some time at Sandy Hook are progressing favorably. At the ordnance office it is said that the contract test has been fulfilled apparently, although other tests will be made in order to be sure of the results before reaching a decision. The stipulations require that the 8-inch gun must be capable of projecting shell charged with 100 pounds of the explosive to all ranges from 100 to 2600 yards, and shell charged with 50 pounds of the explosive to all ranges from 100 yards to 3200 yards.

Each 15-inch gun of 40 calibers' length of bore must be capable of projecting shell to the following ranges:

100 to 2000 yards, a shell containing 500 pounds of the explosive.
100 to 3550 yards, a shell containing 200 pounds of the explosive.
100 to 4500 yards, a shell containing 100 pounds of the explosive.
100 to 5500 yards, a shell containing 50 pounds of the explosive.

If the 15-inch guns should not attain the extreme ranges stated, forfeitures were to be imposed for each yard of deficiency, as follows:

500 pounds' charge.....	\$5.00
200 pounds' charge.....	2.00
100 pounds' charge.....	1.00
50 pounds' charge.....	50

provided that the limit of deficiency should not exceed 10 per cent. of the stated ranges. Seventy-five per cent. of the charged shell fired for explosion on impact were required to show a satisfac-

tory action of the impact fuses, and at least 75 per cent. of such shells fired into water were required to show a satisfactory action of the immersion fuse adjusted for either the time or depth of immersion. In the matter of time to load and fire one shell, containing 500 pounds of the explosive or dummy projectile of equal weight, was not to exceed 3 minutes, ten consecutive rounds in 40 minutes.

A shell containing 200 pounds of the explosive, &c., as above, one in 2 minutes and ten in 27 minutes. For smaller charges, one in 1½ minutes and ten rounds in 20 minutes. The improvements in fuses have greatly facilitated the tests. By a mechanical action it is arranged to work regardless of the position of the shell at impact. The arrangement is simple and effective. The 15-inch dynamite guns have been found more serviceable for all-around use than the smaller 8 inch. The time required for discharging 20 consecutive rounds with the heaviest charges from any single gun it is required must not exceed 1 hour 20 minutes, and 30 consecutive rounds not to exceed 2 hours and 10 minutes.

The officers here are evidently of the opinion that with improvements suggested by practical tests the utility of this gun and projectile in the uses of actual war will be fully established and will add a most destructive agent for sea coast defense, if not in operations afloat.

#### The Bridge for the Hudson River.

The report of the New York and New Jersey Bridge Commission, appointed by the President to consider plans for bridging the Hudson River at New York, has been presented to the Secretary of War. The commission is composed of the following members: Major C. W. Raymond of the Corps of United States Engineers, Theodore Cooper of New York, Prof. W. H. Burr of Columbia College, George S. Morrison of Chicago and G. Bouscaren of Cincinnati. The questions to be considered by the board were to "recommend what length of span, not less than 2000 feet, would be safe and practicable for a railroad bridge to be constructed" over the Hudson.

The report states that with a span of 2000 feet the west pier would be located about 1000 feet from the New Jersey pier headline. If this span should be increased the injury done to the harbor by obstructing the approach to piers on the New Jersey shore would be greater than any benefit gained by the increased width of the channel span. Since there would be no benefit derived from a span greater than 2000 feet unless it reached from pier to pier, the examination is confined to spans of 2000 feet in the clear and 3100 feet in the clear. The bridge must be provided with six tracks. As the river cannot be kept unobstructed during erection the plans are limited to two types—cantilever and suspension. The board are of the unanimous opinion that a cantilever span of 3100 feet in the clear could be built and would be a safe structure, but the practicability of such a structure would depend upon its cost.

The east pier of the 2000-foot span would rest on rock at 125 feet below mean high water. The west pier would reach rock at 260 feet, or 100 feet deeper than any foundation which has ever been put in. The east pier would

consist of four cylinders, each containing 866,000 cubic feet, and costing \$346,400. Each of the four cylinders of the river pier would contain 1,880,000 cubic feet, of which 1,014,000 would be more than 125 feet below water; the cost of the four would be \$9,710,000. The east anchorage would be on rock about 20 feet below water, and the west pier would be on rock 125 feet below water. The east anchorage would cost \$481,000 and the west anchorage \$1,038,000, making the total cost \$14,431,000. The weight of the superstructure is 230,000,000 pounds and the total length 4120 feet.

The piers of the 3100-foot cantilever span would be at about the same depth, or 125 feet. The cost of this bridge would be for the east anchorage \$431,000, east pier \$8,660,000, west pier \$8,660,000, and west anchorage \$527,000. The superstructure weight would be 730,000,000 pounds. The total cost of this bridge is estimated at \$51,128,000, and of the 2000-foot span \$25,443,000.

The report then very fully discusses the suspension type as a railroad bridge. The towers for this bridge would be located at the pier head lines, in practically the same position as the towers of the larger cantilever. The towers would be of steel, 570 feet high from the top of the masonry to the saddles or 620 feet from the surface of the water. The masonry anchorages would be about 1000 feet back of the towers. The cables would be of No. 3 wire having a guaranteed strength of 180,000 pounds per square inch. The estimate is made on a versed sine of 400 feet or one-eighth the span. In the Brooklyn Bridge it is less than one-twelfth the span. The two stiffening trusses would be riveted lattice girders 120 feet deep and placed 100 feet between centers. The floor beams are hung from the suspenders and carry the stiffening truss. The total weight of the suspended superstructure per lineal foot may be taken as follows:

	Pounds.
Four chords, at 4037.5 pounds.....	16,150
Two webs, at 3569 pounds.....	7,018
Laterals.....	1,650
Cross frames and hangers.....	1,920
Floor beams.....	3,000
Stringers.....	1,800
Total steel per lineal foot.....	31,538

This amounts to 100,921,600 pounds for the 3200 feet of span. If to this we add 2400 pounds' weight of the ties and rails and 18,000 pounds for moving load, we have as the total weight carried by the suspenders 51,938 pounds, or 26 tons per lineal foot.

The cables weigh 14,792 pounds per lineal foot, and as the total weight to be carried by them may be taken as 63,100 pounds per lineal foot, we have a total weight for the span of 217,920 pounds. There will be 12 cables, each being composed of 6000 No. 3 wires. The total length of each cable will be 5609 feet. The weight transferred to each tower by the cables is 218,000 pounds. Each tower will weigh 38,023,000 pounds.

The cost of 206,668,600 pounds of structural steel at 4½ cents per pound would be \$9,300,087. The cables and suspenders at 8 cents per pound would be \$6,736,624. The total cost of the substructure would be: East anchorage, \$3,090,000; base for east tower, \$4,572,000; for west tower, \$5,003,480; west anchorage, \$4,815,000 = total, \$17,480,960. The total cost will be as follows: Superstructure, \$16,036,711; substructure, \$17,480,960; total, \$33,517,671. Viaduct, \$1,850,000. Grand total, \$35,367,671.

## MANUFACTURING.

### Iron and Steel.

The Colorado Fuel & Iron Company are doing good work at Pueblo with their pair of 5-ton converters. On August 16 they turned out 315 tons of steel ingots in 24 hours, surpassing the record for any previous day in that plant.

The plant of the Williams Rolling Mill Company, at Muscatine, Iowa, which has been operated during the past 60 days by a receiver, closed September 1 for an indefinite period.

The Irondale Steel & Iron Company of Middletown, Ind., started their new rolling mill on the 31st ult. They will manufacture tin plate, beginning with the steel billet. The starting of the plant was made the occasion of much rejoicing among the manufacturers and other citizens of Indiana, who gathered at the works.

The blast furnace of the Thomas Furnace Company, Niles, Ohio, which has been idle for several months, resumed operations on August 25. This furnace is one of the best equipped in the Mahoning Valley and is 17 x 76 feet in size and has a capacity of about 250 tons of iron per day.

As already announced in these columns the Youngstown Iron & Steel Roofing Company, Youngstown, Ohio, have been organized as a stock company under the laws of the State of Ohio, with the following officials: L. E. Cochran, president; G. M. McKelvey, vice-president; C. S. Pew, secretary; Mason Evans, treasurer, and John O. Pew, general manager. The new concern have now under construction suitable buildings for the manufacture of a full line of metal roofing of all kinds and styles, metal siding and ceiling and when completed it will be one of the best equipped works of the kind in the country. The new plant is so located that there will be direct connection with four of the main trunk lines running East and West, these being Lake Shore & Michigan Southern, New York, Pennsylvania & Ohio, Pennsylvania and Baltimore & Ohio. It is proposed to manufacture the John O. Pew patent standing seam steel and iron roofing, the fastener used being one for which a patent was recently granted to John O. Pew and for which many points of excellence are claimed.

The Edgar Thomson Steel Works, Bessemer, Pa., have been running on rails for several weeks, but have again changed off, and are now filling a large order for blooms for the Johnson Company, Johnstown, Pa.

The blast furnace of the Valentine Iron Company, Bellefonte, Pa., started up last week.

Hubbard Furnace of the Andrews & Hitchcock Iron Company, Hubbard, Ohio, resumed operations last week.

The National Foundry & Pipe Works, Limited, Scottsdale, Pa., manufacturers of cast iron pipe, have recently purchased the plant of the Charlotte Furnace Company, Limited, together with about 52 acres of ground adjoining the property. Included in the purchase is a 25-foot vein of limestone located in Bullskin Township, Fayette County, which was leased by the Charlotte Furnace Company, Limited. The purchasers have not fully decided as yet what disposition they will make of their recently acquired property, but are open for negotiations to lease the plant, they guaranteeing a cash market for the greater part of, if not its whole output.

Eagle Furnace, at Spring Valley, Wis., which banked July 3, was blown in August 14, under the management of H. E. Burt, formerly manager of the York Iron Company.

Hamilton Furnace of Means, Kyle & Co., Hanging Rock, Ohio, is ready for blast, but may not resume operation for several weeks yet.

No. 2 furnace of the E. & G. Brooke Iron Company, Birdsboro, Pa., is being relined and repaired, and is expected to resume blast at an early date.

The output of the rail mill of the Pennsylvania Steel Company, Steelton, Pa., for the month of August is said to have been the heaviest for any one month since November, 1890.

The Philadelphia Ledger has the following from Chester, Pa.: A hearing in the Wellman case was held in the office of W. B. Broomall, receiver, before Master Orlando Harvey, which was attended by William Burnham, representing the

Baldwin Locomotive Works; John Miley of A. & J. Miley of the Lebanon Iron Works; John S. Patterson, Philadelphia; J. Tatnall Lea, Philadelphia; Richard C. McCullough of the Westmoreland Coal Company, David E. Williams & Co., Philadelphia; Hon. William Ward, representing the Pennsylvania Railroad and allied lines. C. M. Reyder appeared representing a citizens' committee of South Chester in the interest of a sale. A statement was made by Mr. McCullough, as president of a committee of creditors, and a petition was presented by him, signed by \$328,000 out of the \$457,000 of unsecured claims, protesting against the sale of the big iron and steel plant. It was a consensus of opinion of all present, including the bondholders and stockholders and unsecured creditors, that the plant ought not to be sold until after January 1, 1895, and with that purpose in view a petition will be presented to the court September 17, asking that a decree of sale shall not be made at this time, and that the receiver shall pay the interest due on the bonds in order to prevent a foreclosure. It appeared at this hearing that there had been over \$1,700,000 spent on the plant, and that if a sale was deferred until business revived it would bring \$1,000,000, whereas if sold now at forced sale it would bring nothing above the bonds, which amount to \$583,000. In this event creditors will only be paid 12½ per cent. All present desired that Receiver Broomall should continue in the management of the works until they shall be sold.

The Co-operative Rolling Mill Company, which was organized several months ago to operate the idle mill, at Hubbard, Ohio, have declared their first dividend. The amount is 1 per cent. All the employees of the mill, except the bookkeeper, have left 50 per cent. of their earnings in the general fund of the institution since it was started, and they are not at all satisfied, it is stated, with the amount received.

Muirkirk Furnace, at Muirkirk, Md., a 36 x 8½ inch charcoal stack, owned by Charles E. Coffin, went out of blast August 25.

Alice furnaces of the Tennessee Coal, Iron & Railroad Company, at Birmingham, Ala., have been cleaned out preparatory to an early resumption.

The Western Nail Works, operated by the Valley Steel Company, Belleville, Ill., have resumed work after a stoppage of eight days, the disagreement on the wage scale having been amicably adjusted. The new wage scale for the Waugh Steel Works has also been adjusted, and the establishment will soon be put in operation.

The South Bessemer Works of the Lackawanna Iron & Steel Company made for week ending September 1, 18 4, running 11 turns of 12 hours each, 6009.8 tons of ingots. The weight of the heats in the converters averaged a little over 9 tons. This is the banner week for this plant. The management modestly adds that it "may be considered fair work for hot weather."

The appraisers of the Maumee Rolling Mill property, at Toledo, Ohio, have completed their work and place the value at \$135,000, of which \$65,000 represents the mill itself. The appraisers were L. S. Baumgardner, J. W. Dale and Frank Losee. The property, it will be remembered, is in a receiver's hands and will be sold this month.

Belfont Furnace, at Ironton, Ohio, blew in September 1.

All the departments of the Portage Iron Works, at Duncanville, Pa., are in operation after an eight months' strike. The puddlers have acceded to the wage scale of \$2.75 per day. The mills will work on double turn.

All departments of the Burden Iron Company's plant at Troy, N. Y., have been started and are now in full blast. The company state that this is simply in accordance with their customary programme—the usual resumption after summer repairs. The puddlers accepted a reduction of 40 cents a ton.

### Machinery.

The business so long and successfully conducted by the Hon. G. W. Fifield, at Lowell, Mass., has been capitalized by him and will be henceforth the Fifield Tool Company. Mr. Fifield retains a large interest and is president and general manager. The new corporation occupy the large and commodious factory owned by them, which embraces 2 acres of floor space devoted entirely to the manufacture of engine lathes. The lathes now being produced are built from an entirely new set of patterns.

The Shaw Electric Crane Company of Muskegon, Mich., are well supplied with work. They are preparing for shipment to the United States arsenal at West Troy, N. Y., a 67-ton crane. It will require the use of five cars to make the shipment. Orders have been received recently for a 20-ton crane for Vienna, Austria; a 2-ton hand rail crane for the Nekeosa Paper Company, Nekeosa, Wis., and 5, 10 and 40 ton electric travelers for the St. Louis Stamping Company, St. Louis, Mo.

The interest upon the scrip of the Westinghouse Electric & Mfg. Company of Pittsburgh to September 1, 1894, will be paid to holders of record of that date.

The plant of the Derwent Foundry Company, Ellwood City, Pa., manufacturers of light and heavy iron castings, is in operation to nearly full capacity.

A contract for 1500 horse-power boilers was recently let to the Heine Safety Boiler Company by the city of Chicago for the new municipal lighting plant. Bids ranged as follows: Babcock & Wilcox, \$28,160; Campbell & Zell, \$20,898; The Stirling Company, \$20,412; Heine Safety Boiler Company, \$19,310; the Caldwell-Standard Boiler Company, \$14,800.

The Boston Department of the Akron Iron Company, Akron, Ohio, has just delivered a 237 horse-power Falls friction clutch cut off coupling to the Wright & Colton Wire Cloth Company of Worcester, Mass., for use in their enlarged power plant, which allows them to throw in and out the wire mill without stopping. There has also been delivered to them a 6-inch hammered iron shaft, together with the ring oiling bearings in which the shaft runs. The Boston Department of the Akron Iron Company has also just fitted out the large new plant of Atwood Brothers, at Whitman, Mass., who are building a fire proof wood working establishment, which is said to be a model of its kind. This complete outfit includes the patent calendered shafting, adjustable self oiling bearings, patent steel rim pulleys and about 40 of the Falls friction clutch pulleys and cut off couplings, which are so arranged in the different lines of shafting as to throw out each machine individually and do away entirely with tight and loose pulleys.

The Cleveland Machine Screw Company, Cleveland, Ohio, have given notice of an increase in stock of from \$200,000 to \$300,000.

Arrangements have been practically completed which will result in the Crescent Machine Company, recently organized at Columbiana, Ohio, locating their plant at Leetonia, Ohio.

Justice Beach in the Supreme Court, Chambers, New York, has granted the motion of the stockholders to dissolve the Cockburn Barrow & Machine Company of Jersey City, N. J., and on their application appointed John F. Anderson receiver for the company.

The new pump works of the Laidlaw-Dunn Gordon Company at Cincinnati, Ohio, are being rapidly completed. The foundry, the first building to be finished, is 100 x 665 feet in size.

A receiver has been appointed for the Park & Lacy Machinery Company of Portland, Ore.

#### Hardware.

The employees of the Consolidated Steel & Wire Company's works, at Joliet, Ill., have been notified that the plant will be started up on the 10th inst. They manufacture barb wire, wire nails and market wire. The old scale of wages has been reduced 10 per cent.

The Young Men's Christian Associations in Washington, Buffalo and Chicago have recently been fitted up with the locks of the Keyless Lock Company, Indianapolis, Ind., and 88 Chambers street, New York.

The Coleman Hardware Company's works, at Morris, Ill., began running on full time on the 23d ult. For over a year the concern had been operating with a reduced force on half time.

The L. Hardy Company of Worcester, Mass., have been incorporated with a capital stock of \$35,000, for the manufacture of machine knives, edge tools, &c., to succeed the business of L. Hardy & Co. of which Henry A. Hoyt was proprietor. The officers of the corporation are L. B. Butler, president; Henry A. Hoyt, treasurer, and Moses Thompson, clerk.

The boiler rooms of the Lakeside Nail Mills, Hammond, Ind., were destroyed by

fire on the 25th ult., causing a loss of \$3000, fully covered by insurance.

The Trenton Brass Mfg. Company of Trenton, N. J., who were incorporated a few days ago, have filed a certificate changing their name to the Crescent Brass Mfg. Company.

The works of C. Hammond & Son, at Philadelphia, Pa., have started up after a long period of idleness.

Chicago capitalists who have organized a wire nail company with a capital stock of \$400,000 are thinking of establishing their plant at Superior, Wis.

The Cleveland Machine Screw Company, Cleveland, Ohio, have increased their capital stock from \$200,000 to \$300,000.

The Valley Paper Company, with a capital stock of \$50,000, have been organized at Beaver Falls, Pa., and have purchased the building formerly occupied by the Hartman Mfg. Company, and also the machinery of the Beaver Falls Paper Company. The company will begin fitting up the machinery preparatory to beginning operations as speedily as possible. The output will be glazed hardware paper.

The Williamsport Staple Company, manufacturers of Hardware specialties, at Williamsport, Pa., have increased the capacity of their plant by the addition of a large boiler and engine.

The American Can & Stamping Works, Limited, have been incorporated at New Orleans, La. Charles B. Emmerich, George H. Dunbar, F. B. Dunbar, Jules Aldridge and W. T. Seaton are the directors of the company. The company will manufacture cans and do a general stamping business. The capital stock is \$50,000.

J. B. Ammons is organizing a company at Houston, Texas, to manufacture agricultural implements, hardware, &c.

#### Miscellaneous.

The Haskell & Barker Company of Michigan City, Ind., have received an order from the Illinois Central Railroad for 500 freight cars.

The Ohio Falls Car Works, at Jeffersonville, Ind., have resumed operations after more than a year's idleness. A contract has been secured for 500 freight cars for the Pennsylvania system, which will enable them to make a good start.

The Eagle White Lead Works of Peoria, Ill., are erecting a three-story building, 102 x 42 feet, with a boiler house 40 x 28 feet. They expect to employ about 40 hands when the factory is finished. A change in name is contemplated, probably to Illinois White Lead Works.

The National Malleable Casting Company last week started a portion of their plant at Indianapolis, Ind., and will put more furnaces at work this week, giving employment to a considerable number of men who have been idle for some time.

The Madison Car Company of Madison, Ill., have started up their works which had been closed since July 1, 1893, when the company made an assignment. A reorganization has been effected with M. Ramsey as president, C. D. McClure, vice-president; Paul A. Fusz, second vice-president and treasurer; A. P. Brigham, secretary. The first work of the company will be to build 100 coal cars for the St. Louis & Eastern Road. When conditions are normal the company employ over 1000 men.

The Moline Pump Company of Moline, Ill., are so crowded with work that the foundry has been obliged to take off a daily heat. They are enjoying the largest run of orders in their history.

Ground was broken on the 24th ult., at Pittsburg, Kan., for the foundations of the new Kansas City, Pittsburg & Gulf Railroad shops. They are expected to employ 300 men when completed.

The McShane Bell Foundry, Baltimore, Md., have received an order for what is said to be the largest chime of bells ever made in America. The chime consists of 17 bells, the largest weighing 5000 pounds and the total weight of bells and fixtures will be about 55,000 pounds. The chime is for the tower of St. James' Church, Chicago.

The Thomas Brass & Iron Company will shortly remove their works from Milwaukee, Wis., to Waukegan, Ill. The new buildings in course of erection at the latter place will comprise a two-story machine shop, 400 x 83 feet, an iron foundry 250 x 60 feet, a brass foundry 200 x 60 feet and a boiler house 144 x 40 feet.

The Pittsburgh Plate Glass Company have declared a dividend of 4 per cent. on the common stock, payable September 1.

One of the officials of the Corlies Engine Works, Providence, R. I., is credited with saying that a general reduction in the wages of the high priced workmen had been decided upon.

The Union Metallic Cartridge Company of Bridgeport, Conn., have placed the order for three large buildings with the Berlin Iron Bridge Company of East Berlin, Conn.

The business of the Cleveland Facing Mills Company, until recently carried on by the Variety Iron Works of Cleveland, Ohio, has been purchased by Geo. P. Millins and Frank H. Chamberlain, and the purchasers will hereafter conduct it under the name of the Cleveland Facing Company.

The Ellwood Gas Stove & Stamping Company, Ellwood City, Pa., manufacturers of gas and gasoline stoves, have just received some large orders for their goods for shipment to Kansas City and Cleveland. Their plant has been put in full operation in all departments, and will be fully employed for some time to come in filling these orders. This concern will shortly commence the erection of an iron truss building, 96 x 84 feet in size, to be used for japanning goods.

The Pittsburgh Crushed Steel Company, Limited, have filed a bill in equity against four of their former employees to restrain them from making and selling a rouge for polishing steel. The rouge is made from a secret formula of the plaintiffs. The defendants learned the formula while in the plaintiffs' employ, but were under agreement never to divulge the secret or to use it. They left the plaintiffs' employ and started in business for themselves. A preliminary injunction was issued, and the case will be heard on September 5.

The Composite Brake Shoe Company of 620 Atlantic avenue, Boston, Mass., announce that they have made arrangements with the Pennsylvania Iron Works Company of Philadelphia and the Kinzer & Jones Mfg. Company of Pittsburgh, Pa., for the manufacture of their composite brake shoe. It is stated that this brake shoe is becoming a standard with many street railways, especially for the electric service, and has superior braking and wearing features. It overcomes the bucking and jerking of the cars where the brakes are applied, and brings them to a quick and easy stop without the usual sliding of the wheels.

Citizens of New Lisbon, Ohio, have raised \$52,000 of the \$60,000 required to secure a tin plate mill for that town.

In the Orphans' Court, at Philadelphia, on Monday, September 3, an order was made authorizing the executors and trustees of the estate of John H. Shoenberger to sell coal lands in Pittsburgh and Unity Township, Westmoreland County, belonging to the estate, to Mr. Shoenberger's former partners in Shoenberger & Co., and Shoenberger, Speer & Co. This was done upon the report of examiner and master, who heard the testimony. The price paid was \$325,000, of which \$100,000 is cash and the balance is to be paid in ten annual payments of \$22,500 each. Security was required in the sum of \$500,000.

The Queen & Crescent Route announce the following changes in their Eastern pig iron tariff, effective September 10:

To	From Dayton and Rock- wood, Tenn.	Chattanooga, Tenn.	Birmingham dis- trict.	Decatur, Flor- ence and Shef- field, Ala.
Albany, N. Y. ....	4.40	4.65	4.90	4.65
Allentown, Pa. ....	4.00	4.25	4.50	4.25
Bridgeton, N. J. ....	4.87	...	4.87	...
Easton, Pa. ....	4.62	4.62	4.87	4.97
Ilion, N. Y. ....	4.40	4.65	4.90	4.65
New York, N. Y. ....	4.60	4.85	5.10	4.85
Pencoyd, Pa. ....	4.27	4.27	4.52	4.62
Providence, R. I. ....	5.00	5.25	5.50	5.25
Providence (rail and water) .....	3.89	...	3.85	...
Rochester, N. Y. ....	3.60	3.85	4.10	3.85
Trenton, N. J. ....	4.62	4.62	4.87	4.97
Troy, N. Y. ....	4.40	4.65	4.90	4.65

## The Iron and Metal Trades.

The Connellsville Coke strike is now a "closed incident," and the serious question is whether the Iron trade of the country must again return to the state of affairs which prevailed before that senseless struggle. A review of the conditions prevailing before the strike and now dominating the markets brings out this one salient fact, that consumption is greater now than it then was. The soft condition of the markets proves that it is not sufficiently great to hold out hopes of an early advance, and the grave question is whether there will be demand enough to prevent a decline, possibly back to the old figures, for Bessemer Pig and Steel Billets.

Ore is actually cheaper than it was, Messaba having been offered lately as low as \$2.10. Coke is still unsettled as to values, no large contracts having been placed lately. So far as Raw Material is concerned there is, therefore, little change in the situation.

The blowing in of so many furnaces west of the Allegheny Mountains has weakened Bessemer Pig, and some fair sales have been made in Pittsburgh at \$11.50.

For early delivery the Pittsburgh Steel Works are practically out of the Billet market. Wheeling and Chicago are taking what urgent business is offering, but on the whole the tone is one of dullness.

In Manufactured Iron and Steel the markets are generally very quiet, and there is a distinct falling off in the demand, which is reflected in a weakening of prices. It is the old story that the large mills insist upon being fully employed, and sacrificing mercilessly to attain that end. Before many weeks roll by the anxiety to secure winter work will make its appearance. Possibly then the railroads may be induced to place orders for equipment of permanent way and for rolling stock. They may then be getting into a position where they can see their way clear toward providing for payment for what they are known to be in sore need of.

To judge from the busy condition of the Cast Iron Pipe foundries, the amount of municipal work going on is large. Town and county bonds sell better than discredited railroad securities.

## Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., September 3, 1894.

The market has been very quiet during the past few days, and in many cases prices are less firm than they were a week ago. Business was somewhat interrupted, however, by what was virtually a two days' holiday, but it is evident that the keen edge of the demand is off, and buyers require a little coaxing before they can be induced to make bids. There is an impression that prices of Steel are relatively too high, and as production is rapidly increasing, it is thought that the general market would sympathize with any weakness in Steel. Moreover, consumption seems to have reached its extreme limits for the present, and as there is no heavy business in sight for the immediate future, it is not unlikely that there will be more or less of a pause before things start up with any degree of activity. In general terms it may be said that there is considerably more business than there was during the first half of the year, and there is some accumulation of orders, but all the same there are symptoms of a slight reaction, both as regards price and demand, and, as we said before, some little shading of quotations is one of the probabilities of the near future.

**Pig Iron.**—The demand is not quite as "snappy" as it was two or three weeks ago, and things may be said to have almost fallen into the old time monotony. Furnaces are well sold up however, and there are no inconvenient accumulations, but there is less disposition to provide for the future, so that the market while not positively weak, is dull and monotonous, as though buyers did not care whether school keeps or not. A few days, or possibly two or three weeks, will more fully develop actual conditions and give some clue to what the trade may expect during the fall and winter months. Bessemer is weaker and could be laid down in consumers' yards at \$13.50 @ \$13.75, perhaps less for late deliveries, but buyers are very conservative and bid for small lots and for prompt shipments only. General quotations are about as follows for Philadelphia and nearby deliveries:

Bessemer.....	\$13.75 @ \$14.00
Standard No. 1 Foundry X.....	12.50 @ 13.00
Standard No. 2 Foundry X.....	11.50 @ 12.00
No. 2 Plain.....	10.75 @ 11.00
No. 1 Soft.....	11.50 @ 11.75
No. 2 Soft.....	10.75 @ 11.00
Standard Gray Forge.....	10.50 @ 10.75
Ordinary.....	10.25 @ 10.50

**Muck Bars.**—Demand slow at unchanged prices, say \$19 @ \$19.25, f.o.b. sellers' yards.

**Steel Billets.**—No business of any account has been done for some time past, although stocks are being rapidly reduced and will need general replenishment during the next 30 to 60 days. September shipments are quoted at \$19.50 @ \$19.75, and needy buyers will probably have to pay these prices, but no one will buy that can get through the month without doing so. The future is uncertain, as makers are firm and stocks in consumers' hands unusually light, so that it may require some time to get prices down to what buyers regard as a legitimate basis. Large consumers consider \$18 to be full value for the last quarter of the year, but in the mean time makers are not inclined to consider anything less than \$19, and that figure is subject to approval as to quantity, delivery, settlement, &c.

**Finished Material.**—There is no material change in the situation, except that the demand has dropped off a little and that prices are hardly as firm as they were a week ago. There is a moderate amount of inquiry, however, and if they result in business it will enable mills to maintain the *statu quo*, but without some increase in the demand beyond that of the past two weeks some of the mills will probably have to go on shorter time. It may be a little premature to suggest anything of that kind, but, nevertheless, the immediate outlook is not as bright as it was some time ago, and a good deal will depend on the amount of business coming out within the next two or three weeks. Some of the mills have a nice accumulation of orders and the day to day demand is still very good, but large orders once in a while are essential to permanent activity. Western mills are competing for business as sharply as ever, so that any order of decent proportions can only be secured by making a special price. Ordinarily small lots are quoted about as follows:

Grooved Skelp.....	1.25¢ @ 1.30¢
Standard Refined Bars.....	1.20¢ @ 1.25¢
Medium quality.....	1.10¢ @ 1.15¢
Tank Steel.....	1.35¢ @ 1.40¢
Heavy Plates.....	1.30¢ @ 1.40¢
Shell.....	1.50¢ @ 1.60¢
Flange.....	1.60¢ @ 1.80¢
Angles.....	1.40¢ @ 1.50¢
Beams and Channels.....	1.50¢ @ 1.60¢

**Old Material.**—There is a good demand for some specialties, such as heavy melting Steel, No. 1 Wrought Scrap and both Iron and Steel Rails, but it is difficult to agree upon prices as holders want more money than consumers are willing to pay. General quotations (delivered) are about as follows:

Heavy Melting Steel.....	\$10.50 @ \$11.50
Light Melting Steel.....	8.00 @ 8.50
No. 1 Wrought Scrap.....	10.50 @ 11.50
Machinery Cast.....	9.50 @ 10.00
Wrought Turnings.....	8.00 @ 8.50
Cast Borings.....	6.25 @ 6.75
Old Iron Rails.....	11.50 @ 12.00
Old Car Wheels.....	9.50 @ 10.00

## Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street, CHICAGO, September 5, 1894.

Again we have to report a considerably increased volume of business. This increase, however, does not embrace all classes of goods. There is a distinct preference shown for goods sold at the lowest prices and the manufacturers and merchants dealing in higher priced commodities are consequently not so well favored with business as their competitors. This accounts to some extent for the conflicting reports which are now current as to the improvement in business.

**Pig Iron.**—Local Coke Iron has been more active and the sales of the week included several round lots. Considerably more business is in sight owing to the gradual extension of the territory covered from this producing center. Shipments are very heavy, the leading producer having delivered the last month the largest quantity sent out any month since June, 1893. Southern furnace agents report a little better demand for carload lots and are inclined to feel confident that the near future will bring them more business. One sale of 100 tons of No. 2 Soft was made for immediate delivery at \$7.25, at furnace. Lake Superior Charcoal is in somewhat better demand in carloads, but inquiries



for round lots are still wanting. Quotations are given as follows for cash:

Lake Superior Charcoal.....	\$14.25 @	\$15.00
Local Coke Foundry, No. 1.....	10.25 @	10.50
Local Coke Foundry, No. 2.....	10.00 @	10.25
Local Coke Foundry, No. 3.....	9.50 @	10.00
Local Scotch.....	10.25 @	10.50
Ohio Strong Softeners No. 1.....	13.00 @	13.50
Southern Silvery, No. 1.....	..... @	.....
Southern Silvery, No. 2.....	..... @	.....
Southern Coke, No. 2.....	10.75 @	11.25
Southern Coke, No. 3.....	10.50 @	10.75
Southern, No. 1 Soft.....	10.75 @	11.25
Southern, No. 2 Soft.....	10.50 @	10.75
Tennessee Charcoal, No. 1.....	..... @	.....
Tennessee Charcoal, No. 2.....	..... @	.....
Alabama Car Wheel.....	17.50 @	18.00
Jackson County Silvery.....	15.25 @	16.00
Other Ohio Silvery.....	14.25 @	14.50
Coke Bessemer.....	11.25 @	11.50
Coke Malleable.....	10.50 @	11.25

**Bars.**—The largest sale of Bar Iron made for some time in this market was consummated last week, when about 1500 tons of Car Iron were sold on private terms. The general condition of trade is better. More buyers are in the market. Prices are fairly steady, at 1.05¢ @ 1.10¢, Chicago, on mill shipments of Common Iron from Old Rail Mixture, and 1.15¢ @ 1.20¢ on Guaranteed Iron. The scarcity of cheap Scrap is mentioned among manufacturers as likely to affect the price of Bar Iron. Soft Steel Bars are still quoted at 1.25¢ @ 1.30¢, Chicago, for mill shipment of moderate quantities, but large buyers are able to do better. An improved demand is noted for small lots of Bars from jobbers' stock. They continue to quote 1.25¢ upward for Iron and 1.35¢ for Soft Steel.

**Structural Material.**—Considerably more work is in sight, especially in the building line. The new Metropolitan Railroad elevated power house will take over 500 tons of material. Quite a number of schemes for warehouses and other structures are coming up. Many of these contracts may not be placed very soon, however, so that in the mean time business is lighter, with a gradual falling off in the demand for small lots from city and country. Quotations of mill shipments, Chicago delivery, are as follows: Beams and Channels, 1.45¢ @ 1.50¢; Angles, 1.40¢ @ 1.45¢; Tees, 1.65¢; Universal Plates, 1.40¢ @ 1.45¢. Small lots of Beams and Channels from stock, 1.75¢ @ 1.90¢; Angles, 1.50¢ @ 1.60¢; Tees, 1.70¢ @ 1.80¢.

**Plates.**—The mills making close prices are favored with a good amount of business, which seems to be of greater volume each week. An inquiry is in the market for 500 tons for hydraulic purposes. Jobbers' sales last month were the best since June, 1893, and show a gain of 25% over August of last year. Their trade shows a steady increase from month to month. A very heavy demand is in progress for Wrought Pipe, and some of the manufacturers are falling into arrears on deliveries. Mill shipments, Chicago delivery, are quoted as follows: Tank Steel, 1.40¢ @ 1.50¢; Flange Steel, 1.65¢ @ 2.10¢; Fire Box, 1.65¢ @ 5¢. Store prices are as follows: Iron or Steel Sheets, Nos. 10 to 14, 1.80¢ @ 1.90¢; Tank Steel, 1.65¢ @ 1.85¢; Flange Steel, 2¢ @ 2.15¢; Boiler Tubes, in carloads, 70% @ 75% off.

**Sheets.**—Mills quite generally are crowded with work and the principal manufacturers are falling behind in deliveries on both Black and Galvanized, while the demand continues excellent. Mill shipments are quoted at 2.35¢, Chicago, for No. 27 Common Iron and 2.45¢ for Steel, and 75 and 15% off for Galvanized Sheets. Sheet Copper is still quoted at 14¢ base, in large lots, with concessions to best buyers. Jobbers are selling from store small lots

of No. 27 Common Black Sheets at 2.40¢ @ 2.60¢, and Galvanized Sheets 75 and 5% to 75 and 10%.

**Merchant Steel.**—The volume of business shows considerable expansion. The improved demand for Tire Steel continues from wagon and carriage builders. General trade also shows improvement. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery Steel, 1.60¢ @ 1.70¢; Smooth Finished Tire, 1.60¢ @ 1.70¢; Open Hearth Spring Steel, 1.85¢ @ 1.90¢; Bessemer Machinery, 1.50¢ @ 1.55¢; Bessemer Tire, 1.40¢ @ 1.45¢; Ordinary Tool Steel, 5½¢ @ 7¢; Specials, 10½¢ and upward.

**Billets and Rods.**—The local manufacturers have made additional heavy sales of Billets, and the Joliet mill will now be able to run steadily through September. The inquiry continues good and sellers confidently expect that more large orders will be entered during the next two weeks. Quotations are maintained at \$18 @ \$18.25. The Joliet mill starts up Thursday with contracts sufficient to run for a month at least. Quotations of rods are steady at \$25 @ \$25.25.

**Rails and Track Supplies.**—Local business is still confined to small lots of Steel Rails, but the manufacturers have been able to book enough orders to keep well supplied with work through September and October. The recent sales of Girder Rails to electric railroads here have been made by Eastern manufacturers, as the local makers confine their attention to Standard Sections. The Pueblo mill has taken another 1000 ton order from a Western road. Quotations are continued as follows: Standard Rails, \$25 @ \$27; Steel Splice Bars, 1.25¢ @ 1.35¢; Track Bolts, with Nuts, 2.10¢ @ 2.20¢; Spikes, 1.65¢ @ 1.75¢; Links and Pins, 1.65¢ @ 1.70¢.

**Old Rails and Car Wheels.**—Holders of Old Iron Rails are not inclined to part with them at low prices, and dealers now make quotations \$11 @ \$11.50. Old Steel Rails are unchanged at \$7.50 for short lengths, but the demand for long lengths has made prices a little firmer, and they may be quoted at \$10 @ \$10.50. Car Wheels would probably advance if buyers were to make any effort to pick up round lots. Nominal quotations are continued at \$10 @ \$10.50, but only for small quantities.

**Scrap.**—The gradual decrease of stocks causes an apparent firmness in prices. Cheap Scrap particularly is very scarce. Dealers quote the following selling prices per net ton: Railroad Forge, \$9 @ \$9.25; Dealers' Forge, \$8 @ \$8.50; No. 1 Mill, \$7; Pipes and Flues, \$6; Iron Axles, \$12.25 @ \$12.50; Steel Axles, \$12.75 @ \$13; Heavy Cast, \$7 @ \$7.50; Stove Plate, \$5 @ \$5.50; Cast Borings, \$3.50; Wrought Turnings, \$5; Axle Turnings, \$6; Fish Plates, \$10; Horseshoes, \$9; Mixed Steel, gross ton, \$5.50.

**Metals.**—Car lots of Lake Copper are unchanged at 9.50¢. Casting Copper is in strong demand in certain quarters and 9½¢ is now asked for best brands. Local producers are sold up for six weeks. Some inquiries are in the market for Spelter but the trade generally continues dull, with prime Western quoted at 3.20¢ @ 3.25¢. Pig Lead opened last week at 3.20¢ but declined steadily until at the close there were sellers at 3.10¢. Still lower prices are looked for.

H. O. Crane, secretary and treasurer of the Rondale Steel & Iron Company of Middletown, Ind., has opened a general sales office for that company in room 1023, The Rookery, Chicago. They will shortly be in the market with a superior quality of tin plate, having their mill fitted up to manufacture the black plates from Billets.

## Pittsburgh.

Office of *The Iron Age*, Hamilton Building, }  
Pittsburgh, September 4, 1894. }

There is a fairly good demand going, but prices all along the line are showing a weaker tendency and on Bessemer Pig a marked decline has occurred. There is now an abundant supply of Coke and no furnace need be idle for want of fuel. Billets are in fair request for close delivery, but buyers and sellers are apart in their views for balance of the year delivery. For Beams, Plates, Bars and Wire articles there is a fair demand, but prices are not as strong as they were, concessions being made for round lots. Taken as a whole, the market is not a discouraging one as the belief is pretty general that the demand will continue to improve, but prices will not likely show much improvement before next year.

**Pig Iron.**—The resumption of additional furnaces in the Valley districts has brought about a slight decline in the price of Bessemer Pig, and \$11.50, Pittsburgh, equal to \$10.85 at Valley furnace, has been the basis of a number of transactions during the week. At this writing some 20 furnaces in the Valley are active, while out of 26 stacks in the Pittsburgh district only three are idle. There is a wide difference in views as to the future of the market. Some in the trade believe that the decline is only temporary, while others hold to the belief that prices will go still lower. It would seem that the Finished Material market is the key of the situation. If there is a good demand for Finished products, thus creating an active Steel market, furnacemen may be able to hold prices where they are, but unless there is a very much heavier demand made on the finishing mills, it is not unwise to assume that Pig Iron will be lower. There is a fair demand for Gray Forge and prices are on the basis of \$10, Pittsburgh, equal to \$9.35 at Valley furnace. A prominent Valley furnace, making a high grade of Foundry Iron, canvassed this market pretty thoroughly last week and took a number of orders on the basis of \$11.75, Pittsburgh, for No. 1 and \$10.75 for No. 2. We quote as follows:

Neutral Gray Forge.....	\$10.00 @	\$10.15 Cash.
Alt-Ore Mill.....	9.75 @	10.00 "
No. 1 Foundry.....	11.75 @	12.00 "
No. 2 Foundry.....	10.75 @	11.00 "
Bessemer.....	11.50 @	11.65 "

We note sales of Bessemer, aggregating some 18,000 to 20,000 tons for September and October delivery, at \$11.50 @ \$11.65, Pittsburgh. Also a sale of 500 tons of Gray Forge at \$10, Pittsburgh.

**Ferromanganese.**—The local maker has reduced the price of 80% to \$50, delivered at buyer's mill, to meet the reduction of \$2.75 per ton on foreign under the new tariff.

**Billets.**—The market is in very peculiar condition and it is somewhat difficult to learn just what prices are ruling. The fact that the Pittsburgh furnaces were able to get Coke long before the Valleys and the Wheeling dis-



trict enabled the Pittsburgh mills to get a fair supply of Pig Iron and to take orders for Steel when other districts were not in condition to do so. The Pittsburgh mills went ahead and sold up their product into September and October and as a consequence have no Steel to spare for September and are declining to quote. Outside districts are getting somewhat firmer in their views and \$17.25 @ \$17.50 for September delivery is being asked. Where October and November are tacked on with September our lower quotation would be shaded. We note a sale of 3000 tons of Rod Billets for September and October delivery at a price equal to about \$17.50, Pittsburgh. Also a sale of 500 tons of Billets for September delivery at \$17.60, Pittsburgh, and a sale of 50 tons of Spot Billets at \$18, Pittsburgh.

**Structural Material.**—Both local mills are being operated to full capacity and have considerable tonnage booked. Pittsburgh continues to get the lion's share of the Eastern trade, and has also taken some good sized orders for Western delivery. We quote Beams and Channels up to 15 inches, at 1.25¢ @ 1.35¢, according to order. Angles and Universal Plates at 1.20¢ @ 1.25¢, and Tees, 1.40¢ @ 1.50¢.

**Plates.**—The volume of business is fairly large, but prices are weak and the charge is made that the same aggressive policy is being pursued as existed earlier in the year. We quote Tank Steel, 1.20¢ @ 1.30¢, according to order; Shell, 1.30¢ @ 1.40¢; Flange, 1.40¢ @ 1.50¢; Fire Box, 2½¢ @ 3½¢, according to quality. On round lots of Tank Plate our lower quotation is being shaded.

**Muck Bars.**—Trade is dull and we quote at \$19 @ \$19.25, delivered, for best grades.

**Bars.**—The demand is very fair and some season contracts are yet to come in that will require a large tonnage. The Valley mills are better employed at this time than for some months. We quote Common Iron Bars at 1¢ @ 1.05¢, usual extras. Steel Bars at 1.05¢ @ 1.10¢, with Bar Iron extras.

**Wire Rods.**—We note a sale of 300 tons for September shipment at \$24, Pittsburgh.

**Merchant Steel.**—The situation is unchanged, and we quote as follows: Bessemer Machinery, 1.30¢ @ 1.35¢; Open Hearth Spring, 1.65¢ @ 1.70¢; Open Hearth Machinery, 1.45¢ @ 1.55¢; Machine Straightened Tire, 1.60¢ @ 1.65¢; Tool Steel, 5¢ @ 7¢ for ordinary grades; 11¢ @ 13¢ for extra grades.

**Barb Wire.**—There is a very fair demand, and while prices are low there is a slightly better feeling, and makers expect to secure better prices before long. We quote Four-Point Galvanized at \$2.05 in carload lots. For round lots this price would probably be slightly shaded.

**Wire Nails.**—Makers report a very satisfactory demand, and all indications point to a heavy fall business. We quote at \$1.05 base in carload lots. The demand for Cut Nails is much improved, and makers believe that prices will soon show improvement. We quote at 90¢ @ 95¢ in carload lots for usual averages.

**Sheets.**—The demand shows some improvement, particularly for Galvanized Sheets. We quote No. 27 Common Iron at 2.25¢ and No. 27 Steel at 2.35¢.

**Pipes and Tubes.**—The order for 6800 feet of Line Pipe referred to last week

has been taken by a Pittsburgh mill. The demand for Pipes and Tubes is active, but prices show no improvement.

**Skelp Iron and Steel.**—There is a very fair demand with prices ruling as follows: Grooved Steel Skelp, 1.05¢ @ 1.10¢; Sheared Steel Skelp, 1.15¢ @ 1.20¢; Grooved Iron Skelp, 1.25¢ @ 1.30¢; Sheared Iron Skelp, 1.35¢ @ 1.40¢, less 2 % cash in ten days.

**Connellsville Coke.**—Last week was a banner one in the matter of production, the output in the Connellsville region being slightly over 121,000 tons. All traces of the long strike are rapidly disappearing. Some few contracts for Coke expire on October 1, and negotiations are now in progress looking to their renewal.

## Birmingham.

BIRMINGHAM, ALA., September 3, 1894.

There is little change to note in the general situation. A gradual improvement in almost all lines of business is reported, and with it a slow gain in general confidence. The reorganization of the railroads will have an effect that will soon make itself felt in general markets, as it will enable repairs and improvements to be made which the receivers could not undertake. Collections are in some instances still very slow, but will materially improve as crops are being harvested.

**Pig Iron.**—The demand in the East for Southern Iron still exceeds that in the West. Sales are good and exceed make, so that preparations for starting more furnaces still continue. The demand for No. 2 Foundry is especially good and some difficulty is felt in supplying immediate shipments. Soft Irons are scarce as heretofore and not kept in stock at all. There is no increase in stocks, except some low grades, which are, however, held to fill larger sized orders. There are comparatively few of these reported, most orders being for carload and 100 to 300 ton lots. There seems as yet no disposition to buy ahead in large quantities. This is especially the case in the higher grades, while Gray Forge records several orders of over 2000 tons at current rates. The question of current rates is a hard one to determine right now. One producer, while practically out of the market, quotes \$1 above current rates; another, not producing to full capacity as yet, shows orders of 200 and 300 ton lots at prices ranging from 25¢ to 45¢ above current rates, while other large producers give the following as current rates: No. 1 Foundry, \$8 @ \$8.25; No. 2 Foundry and No. 1 Soft, \$7.50, top price; No. 3 Foundry, \$7, top price; No. 2 Soft, \$7 @ \$7.25; Gray Forge, \$6.50 @ \$6.75.

**Finished Material.**—The outlook among the mills is reported as not very encouraging. Since the passage of the tariff bill there has been a tendency among Northern mills to rush the market and get all they can. This has a tendency to keep the local mills out of the close markets, and there are no definite indications of an early start. On the other hand repairs and improvements are rapidly pushed at the Birmingham Rolling Mill Company, and heavy stocks of Ore, Billets and Pig Iron are accumulating. There is a tendency to await the result of the new laws on foreign importation. Stocks of Steel Billets, mainly from Ashland, are large, and the tendency to use Steel in large quantities in place of Iron is

very marked. The Birmingham Rolling Mills expect to put in two more sheet mills.

## St. Louis.

(By Telegraph.)

Office of The Iron Age,  
Bank of Commerce Building,  
St. Louis, September 5, 1894.

**Pig Iron.**—The past week has not been particularly active. Sales have been limited both in size and quantity, and yet there is a number of inquiries in the market which will very likely result in business. There is no disposition to shade prices, as it has been pretty thoroughly demonstrated that sales cannot be made simply because the Iron is cheap. Unless consumers really need the Iron they cannot be induced to buy by the offer of cut prices. The situation shows improvement, and, while no great advance in prices is looked for, a slight improvement over to-day's prices does not seem unreasonable to expect. Sales during the week were made on the basis of prices as quoted herewith, which are for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry	dry	.....	\$11.00 @ \$11.25
Southern Coke, No. 2 Foundry	dry	.....	10.25 @ 10.50
Southern Coke, No. 3 Foundry	dry	.....	9.75 @ 10.00
Southern Car Wheel	.....		16.50 @ 17.00
Gray Forge	.....		9.50 @ 9.75
Ohio Softeners	.....		14.00 @ 14.50

**Bar Iron.**—There is no change to note in the situation. The demand is fair, and while railroads and car builders are gradually increasing their purchases, they are not as yet sufficiently large to influence prices, which remain as last quoted—viz., carload lots from mill, 1.10¢ @ 1.15¢. Jobbers quote 1.30¢ @ 1.35¢, according to quantity.

**Barb Wire.**—A gradual improvement is noticed in the demand for Barb Wire. Jobbers are beginning to stock up for the fall trade so that the mills are pretty well employed. The local demand is increasing, and prices are well maintained as follows: Painted, in carload lots, \$1.85; Galvanized, \$2.25. Wire Nails at \$1.20, f.o.b. cars St. Louis, is about a bottom quotation for Nails. For special trade this price is occasionally shaded, but on the other hand sales are made at \$1.25, so that \$1.20 is a fair quotation. The demand is improving, and as stocks are not heavy, either in jobbers' or manufacturers' hands, any substantial improvements in the demand will be quickly reflected in prices.

**Rails and Track Supplies.**—There are more inquiries in the market for Rails, some of them calling for good sized quantities, but as yet no transactions of any note are reported. Track Supplies continue in good demand at unchanged prices. We quote as follows: Splice Bars, 1.35¢; Spikes, 1.70¢ @ 1.75¢; Bolts, Square Nuts, 2¢; with Hexagon Nuts, 2.10¢; Steel Links and Pins, 1.55¢; Iron, 1.65¢. Standard Rails are quoted at \$26.50 @ \$27; Old Iron Rails are nominally \$10 @ \$10.50.

**Pig Lead.**—Some heavy sales of future delivery have been made at from 3.05¢ @ 3.10¢, while spot lots command as high as 3.20¢. The consumptive demand is not heavy, and the larger part of the sales recorded is speculative.

**Spelter.**—There are no heavy buyers in the market, but the run of small

orders shows a steady increase, so that the volume of business is about the average. The market is quoted from 3 20¢ @ 3 25¢, although the former price is the one at which most sales have been made.

## Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts.,  
CINCINNATI, September 6, 1894.

There has been a fair volume of business during the week, and the beauty of it is that it was nearly all in this district, the demand coming largely from the Iron Pipe works, which seem to have an unusually good demand for Pipe for this season of the year, and for small sizes, and able to obtain better prices than have prevailed during the summer. The demand is largely for No. 2 Foundry, No. 2 and No. 1 Soft, but the lower grades and Forge Iron is selling well, and the market may be called steady and firm. Prices are the same for forward delivery, running to the end of the year as for current delivery, and there have been sales covering three months of next year on the same basis. There were several sales of 1000 tons each, but more generally 500 tons is as much as buyers are disposed to contract for, and there are enough of these to make the aggregate reach nearly to the proportions of old times. The Iron Pipe works are melting much metal, but the stove works are doing more work. The agricultural works are not idle, but have not begun to work actively. There is little demand for Charcoal Iron, but some of the car works and repair shops are preparing to do more work. Quotations are as follows:

### Foundry.

Southern Coke, No. 1.....	\$10.50 @ \$10.75
Southern Coke, No. 2.....	9.75 @ 10.00
Southern Coke, No. 3.....	9.25 @ 9.50
Ohio Soft Stone Coal, No. 1.....	14.50 @ 15.50
Ohio Soft Stone Coal, No. 2.....	14.00 @ 14.50
Lake Superior Coke, No. 1.....	12.50 @ 13.00
Lake Superior Coke, No. 2.....	11.50 @ 12.00
Hanging Rock Charcoal, No. 1.....	16.00 @ 17.00
Hanging Rock Charcoal, No. 2.....	15.50 @ 16.00
Tennessee Charcoal, No. 1.....	13.00 @ 13.50
Tennessee Charcoal, No. 2.....	12.00 @ 12.50

### Car Wheel and Malleable Irons.

Standard Southern Car Wheel	16.25 @ 17.00
Lake Superior Car Wheel and Malleable.....	15.25 @ 15.75

### Forge.

Gray Forge.....	8.75 @ 9.00
Mottled Coke.....	8.50 @ 8.75

## Louisville.

LOUISVILLE, KY., September 1, 1894

There has been no improvement in the price of Iron and it continues to be offered freely. Grades that were scarce are now in more abundance, and buyers do not feel that any advance need be expected in the immediate future, but yet are willing to purchase, where furnaces will sell for long delivery, at present prices. Business unquestionably is reviving, but there are so many furnaces out of blast that can go in that this improvement in trade does not indicate a revival of importance enough to command prices higher than the present basis for several months to come. We quote for cash, f.o.b. cars Louisville:

Southern Coke, No. 1 Foundry.....	\$10.00 @ \$10.50
Southern Coke, No. 2 Foundry.....	9.25 @ 9.50
Southern Coke, No. 3 Foundry.....	8.75 @ 9.00
Southern Coke, Gray Forge.....	8.50 @ 8.75
Southern Charcoal, No. 1 Foundry.....	12.50 @ 13.50
Southern Car Wheel.....	15.00 @ 15.50

## Financial.

The over sanguine individuals who looked for an immediate boom in the markets on the passage of the tariff bill have been doomed to disappointment. The gain in general business since the measure became law has not assumed the proportions many people expected. Yet there has been improvement in many quarters, and, as compared with last year, the gain is quite marked. At this time last year, however, the country was plunged in the depths of depression, the months of August and September, 1893, being the worst of a bad season. Comparison of the condition of current business with that of the corresponding period of last year does not, therefore, indicate any extraordinary activity. Indeed, as compared with 1892, at the same season, business in general is still decidedly dull. The volume of Clearing House exchanges throughout the country for the month of August, although showing a gain of 8 2 per cent. over 1893, is still 21.5 per cent. lower than that of August, 1892, while the average of prices for products of all kinds is only 5 per cent. lower than they were at that time. Trade reports from all sources indicate, nevertheless, a better feeling among buyers and a more active movement of goods. This is notably the case in the dry goods and boot and shoe trades, which have both experienced a considerable accession of activity in the past week. The demand for other products is also growing, and the imports of general merchandise show a marked increase.

The improvement in business conditions is reflected in the prices of securities, which, after the reaction of last week, have again advanced during the past few days and remain, at this writing, firm at the higher rates. As usual, Wall street discounted the effect of the passage of the tariff law nearly two weeks ago, when the prices of stocks and bonds advanced sharply in an active market. This buoyancy was followed by a partial relapse last week, several securities, especially those on the "industrial" list, affected more or less by the new duties, falling materially. Of these, Sugar was the most prominent, losing nine points during the week. Since the opening of the present week the movement of stocks has again been upward and the general tone of the market is more confident. The grangers show a very gratifying advance all round in spite of unfavorable crop reports. Burlington, Rock Island and St. Paul have all secured substantial advances in prices, while Atchison and Northern Pacific have shared in the improvement to some extent. The rise in St. Paul and Rock Island is due largely to the belief that both those roads will pay their regular dividends this month, Rock Island being about to receive \$4,000,000 by the redemption of its holdings of Minneapolis & St. Louis improvement and equipment bonds.

The improved report of earnings of Louisville & Nashville accounts for a rise of nearly 4 points in those stocks. The July statement of the road shows an increase of \$3836 for the month, in place of the decreases hitherto reported. Nevertheless it is said that the increase of more than a fourth in the value of the property during the last month has been largely engineered by a "bull pool." Western Union is another stock that has secured a marked advance in value during the past day or two, on the report that the full regular dividend will be announced at the directors'

meeting next week. Among other stocks which have come into prominence through favorable buying are General Electric and Missouri Pacific. Generally the list was strong at the close although business was dull. Dealings on the Stock Exchange are still almost entirely confined to the professional element. The outside investing public still holds aloof.

The following list, which shows the highest and lowest prices of the leading railroad and industrial stocks during the month of August and the prices at which they closed on the last day of the month, illustrates the improvement which has taken place subsequent to the settlement of the tariff question:

	High- est in Aug.	Low- est in Aug.	Closing Aug. 31
Am. Sugar Ref.....	114 1/4	102	104 3/4
Atchison, T. & S. F.....	7 1/2	3 3/4	7 1/2
Balt. & Ohio.....	76 1/2	63 1/2	76 1/2
Chicago Gas.....	78 1/2	71 1/2	74 1/2
Chic., B. & Q.....	79 1/2	70	77 1/2
Chic., Mil. & St. Paul.....	66 1/2	56 1/2	65 1/2
Chic., Rock Isl. & Pac.....	69 1/2	62 1/2	65 1/2
Del., Lack. & Western.....	167 1/2	162	166 1/2
Distilling & Cattle Fdg.....	24 1/2	17 1/2	18 1/2
Gen. Electric.....	44 1/2	3 3/4	39 1/2
Lake Shore.....	139	128 1/2	135
Louisville & Nashville.....	57 1/2	45 1/2	56 1/2
Manhattan.....	122	112	118 1/2
Missouri Pacific.....	31 1/2	23 1/2	29 1/2
National Lead, Common.....	44 1/2	38	42 1/2
New Jersey Central.....	116	106 1/2	113 1/2
N. Y., L. E. & Western.....	16 1/2	12 1/2	15 1/2
Northern Pacific, Pfd.....	20 1/2	13 1/2	20 1/2
Philadelphia & Reading.....	22 1/2	17	21 1/2
Richmond & West Pt.			
Term.....	18 1/2	14 1/2	17
U. S. Cordage.....	23	17 1/2	18
Union Pacific.....	14 1/2	7 1/2	13 1/2
Western Union.....	90 1/2	84 1/2	89 1/2

Considerable more activity has been displayed in the bond market than in the stock market. The volume of dealings has been comparatively higher and the tendency has been toward steadily increasing prices, especially in the railroad issues. Last week more than 30 denominations scored advances of from 1 % to 3 1/2 %, while few declined at all. Business in both railway and miscellaneous bonds has been large since the opening of this week, and the market closed firm and high on Wednesday. Government bonds have been firm, prices remaining unchanged at the following quotations:

	Bid.	Asked.
2's, 1891, registered.....	96	.....
4's, registered.....	113 1/2	114
4's, coupon.....	114 1/2	115
5's, registered.....	118 1/2	119
5's, coupon.....	118 1/2	119

The tendency of the market for Sterling has been toward lower rates. The supply of bills on Tuesday, after three days' holiday, was much larger than usual, and considerably in excess of the requirements of remitters, consequently the market showed decided weakness. Actual business was done on Wednesday at \$4.85 1/2 for 60 days, \$4.86 1/2 for demand, \$4.86 1/2 @ \$4.86 1/2 for cables and \$4.84 @ \$4.84 1/2 for commercial.

Domestic exchange on New York is quoted as follows: New Orleans, commercial 50 discount, bank par; Savannah, buying par, selling, 1/4 premium; Charleston, buying at par, selling at 1/4 @ 1/2 premium; San Francisco, sight, 12 1/2; telegraph, 15; Boston, 10 @ 12 1/2 discount.

Saturday's bank statement caused surprise by exhibiting a much smaller increase in the volume of loans than was expected, while the cash held by the New York banks was shown as only \$50,000 less than the week before. The loss is almost unaccountably small. All the changes resulted in a decrease of the surplus reserve of \$897,825, the amount now standing at \$65,820,825.

The following is a comparison of the averages of the New York banks for the last two weeks:

	September 1.	August 25.	Increase
Loans.....	\$489,879,900	\$488,763,700	\$1,116,200
Specie.....	91,187,800	90,744,800	443,000
Legal tenders	121,126,500	122,420,300	*1,293,800
Deposits.....	585,973,900	585,785,800	188,100
Circulation..	9,784,800	9,758,700	26,100

\* Decrease.

The shipments of currency to country banks from this center continue light and are not thought likely to assume any large proportions until the bulk of the grain and cotton crops is actually ready to move. There is still but little demand for idle capital. Money on call rules at 1%, and the market for time money shows hardly any change. There is no diminution in the supply nor expansion in the demand. Rates are quoted at 2% for 60 days, 2½% for 90 days, 3% for 4 months, 3½% for 5 months, 3½% @ 4% for longer periods. Foreign funds have been loaned during the week at the rate of 2½% for 4 months, with the stipulation of repayment in gold.

Mercantile paper is in fair demand, but the supply of high grade material continues limited. Rates are 2% @ 3½% for indorsed bills, according to grade; 4% @ 4½% for first-class single names, and 4½% upward for others.

Bar silver has lost a fraction during the week under review. On Wednesday it closed in London at 30½ pence, and in New York at 65½¢, nominal, per ounce. Shipments from New York to the extent of nearly 1,000,000 ounces have been made since our last report.

The Governmental report of receipts and expenditures for August, while not quite as favorable as had been expected, is nevertheless a very gratifying exhibit. The total receipts were \$40,417,605 81 and the expenditures \$31,656,636 85, showing a net gain of \$8,760,968 96 for the Treasury balance this month. For the two months of the fiscal year 1895 there is a net gain of \$6,921,726 18, against a deficit for the corresponding two months of the fiscal year 1894, of \$18,184,455 59. This is a gain over last year, therefore, of over \$25,000,000 for the two months. Of the receipts for the month \$11,804,914 21 were from customs and \$27,562,278 80 were from internal revenue. The gold reserve stood at the end of the month at \$55,216,900 49.

## Metal Market.

**Pig Tin.**—Comparatively little change in prices has taken place during the past week, and dealings on speculative account reached only a moderate total. Purchases by interior jobbers have increased somewhat, however, and business with consumers has been more liberal. Prices at this writing are about 16¢ net cash for 5-ton or larger lots, and the market shows strong tone.

**Copper.**—New business has been on a moderate scale, and the demand generally very slack. There is little if any selling pressure, however, and prices remain steady at 9½¢ @ 9½¢ for Lake Superior Ingot; 8½¢ @ 8½¢ for Electrolytic and 8½¢ @ 8½¢ for common casting stock.

**Pig Lead.**—Common domestic for prompt delivery is quoted at 3.30¢ and the market seems to be fairly firm because of moderate offering. Near future deliveries are somewhat uneven and rather weak, with fairly free offering and 3.25¢ apparently all that could be realized.

**Spelter.**—Hardly any change has taken place in the market here. The movement continues to be rather slow, and consumers are extremely indifferent. Prices remain at about 3 40¢ @ 3 45¢ for ordinary Western brands.

**Antimony.**—Spot prices are about 7½¢ for Hallett's and 9½¢ for Cookson's. There has been little business outside of ordinary jobbing distribution.

**Tin Plate.**—Spot dealings have been on a very moderate scale and chiefly at about the prices that ruled a week ago. Futures are quieter, and, while not positively lower, prices seem rather easier. For deliveries this month the quotations are as follows: Charcoal, Melyn grade, IC, \$6; do., Melyn grade, Crosses, \$7.75; do., Allaway grade, IC, \$5.30; do., Allaway grade, Crosses, \$6.40; do., Grange grade, IC, \$5.45; do., Grange grade, Crosses, \$6.45; do., Terne, M. F., 14 x 20, \$7.20; M. F., 20 x 28, \$14.40; Worcester, 14 x 20, \$5.70; do., 20 x 28, \$11; Alyn grade, 14 x 20, \$5.05; do., 20 x 28, \$10 @ \$10.25; D. R. D. grade, 14 x 20, \$4.85; do., 20 x 28, \$9.70. IC Cöke: Penlan grade, \$5; do., J. B. grade, 14 x 20, full weight \$5.10; do., 100 lb, \$4.80; do., 95 lb, \$4.65; do., 90 lb, \$4.55. IC Bessemer Steel, Coke finish, 14 x 20, full weight, \$5.10; do., 100 lb, \$4.77½; do., 95 lb, \$4.62½; do., 90 lb, \$4.55. IC Bessemer Steel, Coke finish, sq., \$5.30. IC Siemens Steel, Coke finish, sq., \$5.35. Wasters: S. T. P. grade, 14 x 20, \$4.60; do., S. T. P. grade, 20 x 28, \$4.80; do., Abercarne grade, 14 x 20, \$9; do., Abercarne grade, 20 x 28, scarce.

Dr. David T. Day, Chief of the Division of Mining Statistics and Technology of the United States Geological Survey, has issued the preliminary statement of the production of Spelter for the first six months of 1894. It was compiled by C. Kirchhoff, special agent:

Production of Spelter Semi-Annually  
(Short Tons).

States.	First half 1892.	Second half 1892.	First half 1893.	Second half 1893.	First half 1894.
Eastern and Southern.	6,901	7,594	7,380	5,304	5,064
Illinois and Indiana....	15,483	15,900	16,427	13,169	13,392
Kansas.....	14,161	10,551	13,269	9,546	11,250
Missouri.....	8,954	7,713	8,718	5,019	6,458
Totals.....	45,499	41,761	45,794	33,038	36,164

A partial statement of stocks shows a decline from 3089 tons on January 1, 1894, to 2859 tons on July 1, 1894.

Pittsburgh Reduction Company, Pittsburgh, Pa., manufacturers of pure aluminum, have located a branch office in New York at 4 Havemeyer Building, corner Church and Dey streets. It will be in charge of James C. McGuire, New York agent and consulting engineer. Their new works, at Niagara Falls, N. Y., will be completed very soon. They will continue to operate their present works at New Kensington, Pa.

The Phosphor-Bronze Smelting Company, Limited, Philadelphia, have issued a new price-list of Phosphor Bronze in roll, sheet, wire and circles; Phosphor Bronze Ropes, Nails, Wire Cloth, Pump Rods, Bolts, Nuts, Washers, Screws, Sash Chains, Links, Valves, Cocks, &c.;

"Elephant Brand" Phosphor Bronze and other alloys in ingots or castings; and Gunpowder, Mill Tools, &c. The price-list is in booklet form, contains 20 pages.

## New York.

Office of *The Iron Age*, 95-102 Reade street, New York, September 5, 1894.

**Pig Iron.**—There are some inquiries in the market, but the movement is as yet very moderate. We quote standard brands \$12 50 @ \$13 for No. 1; \$11 @ \$12 for No. 2, at tidewater. Southern Iron, same delivery, \$11.50 @ \$12.25 for No. 1; \$10.50 @ \$11 for No. 2; \$10 @ \$10.25 for No. 3; \$10.25 @ \$10.75 for No. 3 Soft, and \$10.50 @ \$11 for No. 1 Soft. Foundry No. 4 (Foundry Forge) is \$9.75 @ \$10.25.

**Spiegeleisen and Ferromanganese.**—The leading American maker has reduced prices to meet lower cost of importation. We quote in the absence of business, nominally: Foreign, \$20.50 @ \$21 for 20% Spiegeleisen, and \$50 @ \$50.50 for 80% Ferromanganese.

**Billets and Rods.**—The market is dull. We note a sale of a small lot of Wire Rods, prompt cash, at special terms. We quote nominally Domestic Billets \$19 25 @ \$19 50, and Wire Rods \$26.25 @ \$26 50, tidewater.

**Steel Rails.**—This market is exceedingly dull at \$24 at mill for standard sections. For certain deliveries this price would probably have to be shaded to keep out foreign Rails.

**Track Material.**—We quote as follows for small lots: Spikes, 1.50¢ @ 1.70¢; Fish Plates, 1.20¢ @ 1.40¢; Track Bolts, Square Nuts, 2¢ @ 2.10¢, and Hexagon Nuts, 2.10¢ @ 2.30¢, delivered.

**Swedish Material.**—Efforts to arouse interest among buyers in Swedish Material, on the ground of lower cost of importation, have not been successful thus far.

**Manufactured Iron and Steel.**—The market is very quiet. To-day a contract for a good amount of Structural Material will probably be closed, but otherwise there is nothing of consequence doing. Plates are quiet. There has been some movement in Bars. We note sales of about 500 tons of 50,000 lb all Muck Bar Iron, on the basis of 1.30¢ delivered here, by a Central Pennsylvania mill. We quote: Beams up to 15-inch, 1.35¢ @ 1.50¢ for round lots; Angles, 1.30¢ @ 1.35¢; Universal Mill Plates, 1.25¢ @ 1.35¢; Tees, 1.50¢ @ 1.60¢; Channels, 1.40¢ @ 1.50¢, on dock. Steel Plates are 1.30¢ @ 1.40¢ for Tank; 1.40¢ @ 1.50¢ for Shell; 1.60¢ @ 1.65¢ for Flange, and 1.75¢ @ 2¢ for Fire Box, and 2¢ @ 2.25¢ for Locomotive Fire Box, on dock; Refined Bars are 1.25¢ @ 1.9¢, on dock, and Common 1.10¢ @ 1.20¢; Soft Steel Bars are 1.15¢ @ 1.30¢; Scrap Axles are quotable at 1.35¢ @ 1.50¢, delivered; Steel Axles, 1.35¢ @ 1.50¢, and Links and Pins, 1.40¢ @ 1.60¢; Steel Hoops, 1.40¢ @ 1.50¢, delivered; Cotton Ties, 67¢ @ 75¢ @ 45-lb bundle, tidewater; Machinery Steel, 1.20¢ @ 1.40¢; Toe Calk, 1.70¢ @ 1.90¢, and Sleigh Shoe, 1.55¢ @ 1.75¢, delivered.

A correspondent of *The Iron Age* desires to know what rolling mill can furnish 4 x ½ inch and 4½ x ½ inch beveled edged iron. An effort has been made to obtain this information, but thus far unsuccessfully.

## British Metal Market.

[Special Cable Dispatch to The Iron Age.]

LONDON, September 5, 1894.

The Pig Tin market has been quieter and prices have changed in a moderate way only. After a slight relapse, due to realizing by holders here and quietness of American demand, prices recovered on purchases by the "bull" syndicate. Forward dealing is now somewhat difficult, and outside operators are timid owing to sharp fluctuations in prices latterly and uncertain future. Straits shipments last month were 3700 tons. Stocks here have slightly increased. Dealings to-day were at £70. 10/ for prompts and £72. 17/6 for three months' futures.

Copper is easier in tone, but prices have moved to a slight extent only. Speculative transactions were large early in the week, but subsequent realizing, caused by weaker advices from New York, brought about a reaction. Chili charters last half August were 1400 tons. European visible supply has increased 1454 tons and spot stocks are larger by 1154 tons than they were early in the week. Chili Bars at the close were quoted at \$40 for prompt delivery and \$40. 5/ for three months' futures. Best selected English £42 @ £43.

Tin Plate has been quiet, and prices are easy. Home inquiry is fair, and there is some call for squares and odd sizes for the oil trade. American buyers, as a rule, are holding off. The Burry & Gorslinon works are restarting. Makers' quotations remain about the same as they were last week.

Pig Lead is without important change; only a fair business is passing. Prices remain at about £9. 17/6 @ £10 for Soft Spanish.

Spelter has been quiet, and the market is without decided change. Prices to-day are about £15. 17/6 @ £16 for ordinary Silesian.

The National Tube Works Company, McKeesport, Pa., have been awarded a contract for 8300 feet of 12 inch standard lap welded steel pipe,  $\frac{3}{8}$  inch shell, at \$1.40 per lineal foot, net cash within 30 days after delivery of same, for Shenandoah, Pa. The pipe is to weigh 49 pounds per foot, including couplings, subject, however, to the usual variations of 5 per cent. incident to manufacture; average length to be from 18 to 19 feet, and each length to be fitted with one heavy recessed line pipe coupling with taper threads; pipe to be tested before shipment to withstand a pressure of 800 pounds per square inch.

The Secretary of the Navy, it is announced, will write certain firms to submit samples of cast steel projectiles for the 13 inch gun, to hold a bursting charge of 60 pounds of powder. I. G. Johnson & Co. of Spuyten Duyvil, N. Y., have successfully manufactured shells of this character for guns of smaller caliber; and this concern, together with the Taylor Iron & Steel

Company, Highbridge; the Windale Steel Company, the Carpenter Steel Company, and the Sterling Steel Company will, it is said, compete.

## The Tin Plate Manufacturers.

(By Telegraph.)

PITTSBURGH, September 5. — The Tinned Plate Manufacturers' Association of the United States is in session in Pittsburgh to-day for the purpose of discussing what reduction in wages has been made necessary by the reduction in the tariff on tin plates. Tomorrow a conference will be held with a committee from the Amalgamated Association, but it is not expected that a settlement will be reached for some little time as a thorough investigation into the changes in the selling prices of tin plates under the new tariff will be had.

What is called a new branch of metallurgical science has just been opened up in France, which is likely to have an important influence upon the iron and steel industry in that country. This discovery is due to the researches of the commission which was formed in 1891 by the French Government, with a view of determining upon some more accurate method of testing constructive material than at that moment existed in France, and to the absence of which was attributed, however groundlessly, the failures of important bridge and other works that had become unpleasantly frequent. A report upon the inquiry of the commission has just been drawn up by MM. L. Bacé and Debray, who set forth results that are considered by them, and by those who thought the commission necessary, to be of the greatest value to the metallurgical industry. By the aid of a microscope it is said to be found possible to detect molecular changes in metals, that vary according to the constituents of which they are composed. The changes of appearance are of almost infinite variety; and each of these appearances is said to show accurately the presence of certain elements, some of which may be in such small quantities as to be undetected by chemical analysis. For instance, the presence of phosphorus in tin bronze causes a characteristic granular appearance that cannot be confounded with any other constituent, and the smallest quantity of aluminum will produce a distinct change in the metal. The value of this new science "Metallography"—as it is called—lies particularly in the fact that it will allow of the most delicate alloys being made, and it opens up a very wide field for metallurgical research; but its value in bridge construction seems remote, and does not point the way to design bridges that will stand with insufficient material, nor to avoid the necessity for experience in the proper disposition of material.

The Garland Chain Company, Rankin, Pa., manufacturers of Eureka weldless chain, have just purchased an equipment of new machinery from the Lodge & Davis Machine Tool Company of Cincinnati, Ohio, to be used in connection with the manufacture of chain. The plant of this concern is now in full operation, and some large orders have been received for their Eureka weldless chain.

## The Tin Plate Tariff

The initial effects of the new tin plate tariff are shown in the closing down of all the smaller tin plate "dipping" works in this vicinity, a proceeding which will, doubtless, generally be followed by these establishments in other quarters. The ground seems to have been completely cut from under the feet of these and similarly placed establishments, unless, indeed, the price of domestic black sheets is very materially reduced; as, under the revised tariff, they cannot afford to buy the imported article and dip it, so as to sell their product in competition with the foreign tin plates imported under the new duty of 1.2 cents per pound. The only other way of escape for the American dipper making the cheaper grades of plates would be if the Welsh manufacturers plucked up courage to raise their prices for the finished plates sufficiently high to approximate the possible prices at which American black plates can be profitably coated and sold here. It seems hardly likely, however, that our Welsh competitors would pursue so shortsighted a course in respect to their own interests after all they have suffered from the recent restriction of American orders.

The naval torpedo station at Newport, R. I., is full of activity. A press dispatch from that place reports as follows: Work is being pushed with all speed on the preparation of the new gun cotton factory at the torpedo station. The buildings are completed and the machinery is being set up as it arrives, and a few months will see it in operation. The plant is being further extended for the manufacture of smokeless powder. Two new buildings, on the general plan of those already up, are under construction, as is a test range for the trial of the powder in rapid fire guns, on Rose Island, where is already situated the magazine of the station. A range for the testing of the torpedoes' direct fire at the torpedo station dock is to be dredged out immediately. There is much work doing in the line of preparing torpedo outfits for the several new ships. That of the "San Francisco" is now ready for delivery.

The drought in the West has materially benefited one branch of business. It created a strong demand for pumping apparatus, which includes wind mills, pumps, tanks, &c. The severity of the drought, surpassing anything experienced in a section accustomed to long stretches of dry weather, will very probably cause those who can raise the money to mitigate the destructiveness of future visitations of the same character by boring numerous wells and providing pumping appliances. The outlay will be heavy, but the benefits will much more than compensate for it.

On Labor Day an extensive strike of clothing workers was inaugurated in New York City. The strike is ostensibly directed against the "sweating" system.

The Woodward Colliery of the Delaware, Lackawanna & Western Railroad Company made an extraordinary record last week in holsting 1503 cars of coal, aggregating 3150 tons, up a deep shaft in one day of ten hours. The highest previous record ever made was 1400 cars, which was regarded as phenomenal.

# HARDWARE.

## Condition of Trade.

**T**HE TRADE will note with satisfaction the evidence of a general improvement in the demand upon the jobbing trade which is contained in the following reports from the leading Hardware centers. It will be seen that in nearly all cases a decided increase in the volume of business is reported and reference made to the prevalence of a perceptibly better feeling. Business is experiencing relief from the uncertainty which has prevailed during the past months owing to tariff agitation, and now that this question is settled, for the present at least, trade is apparently resuming its normal course, and whatever may be the changes in price which will result from the new law, its enactment removes one of the obstacles to business activity. The effect of this is as yet more marked in some other lines of business than in Hardware, and merchants in such lines report a very decided increase in the demand, many houses being exceedingly busy. It is to be expected that Hardware and related lines will soon feel the influence of the improved general conditions of business, and already there is a decided improvement in the feeling of merchants and manufacturers, as well as in the volume of business. It is to be expected that as the month advances there will be a further improvement. The smaller trade are replenishing stocks more freely than for some time, and their orders indicate that they are doing a better business and are anticipating a fair, if not heavy, trade during the next few months. Prices are without important change. While values are, on the whole, as low as they have been at any time during the year, in only a few cases has there been any further shrinkage, and, though low, prices are, on the whole, well maintained.

### Chicago.

(By Telegraph.)

Shelf Hardware jobbers note a very decided increase in the demand for all classes of goods. Some houses have been obliged to work their packing departments at night. Merchants now show more of a disposition to stock up. New ventures are also a little

more frequent in the Hardware line and several full stocks have been shipped out recently. The trade in tin plate is particularly heavy. The stocks of imported plates are kept low on account of the approaching reduction in duty, but the steady demand compels constant withdrawal from bonded warehouses, even if the full rate of old duty has to be paid. Pig tin and solder have been reduced in price to conform with the new rates of duty. Heavy Hardware jobbers report that they have gained fully one-third in volume of business, as compared with the average of the early summer months. General consumers are buying Iron and Steel in larger quantities, and manufacturers with mill contracts are occasionally picking up the material needed to help out. Some season contracts have been closed for Carriage Materials. The local trade have made reductions in the price of Anvils and Norway and Swedish Irons to conform with the new rates of duty. The sympathy of this community goes out to the unfortunate residents of Northern Minnesota and Wisconsin, who have been so scourged by forest fires the past week.

### St. Louis.

(By Telegraph.)

Hardware jobbers have no reason to complain regarding the business they are doing. The month of August will show substantial gains in comparison with August of last year, and the present month starts out very auspiciously. Orders are increasing in size, and while there is no disposition among retailers to anticipate their wants too far ahead the fact that they are gradually increasing their orders is reason for congratulation. Stocks in both jobbers and retailers' hands are estimated to be from 25 to 35 per cent. lighter than they usually are at this time of the year, so that a few weeks of heavy buying would leave stocks in a depleted condition. At present the demand for Shelf Goods is on the increase, and Axes, Firearms and Stove Furnishings are included in orders now received. Prices are unchanged except in articles which are affected by the new tariff, which are being adjusted to meet the new conditions. Collections are fair.

### San Francisco.

MILLER, SLOSS & SCOTT.—We are pleased to report that during the past month the volume of sales has, if anything, increased. There is, however, no increase in the demand for goods in quantities, it being still the evident rule to purchase only for actual immediate requirements.

Our harvest season is now at hand, and though our crops have turned out larger than we were led to believe in the early part of the season, the prices realized are not sufficient to circulate any great amount of money in our farming community. Under such conditions we cannot look for any improvement in trade for some time to come, perhaps not until next spring. With all this, collections have been considerably better than for some time past.

### St. Paul.

FARWELL, OZMUN, KIRK & Co.—The trade for August has been quite satisfactory to our jobbers. Goods in all lines have moved briskly, and Hardware has kept the pace. There has been some difficulty in getting goods and in keeping up stocks, but this feature is improving, and we can report the trade as in a very healthy condition. The crops are fully up to average in quantity and above average in quality throughout the territory tributary to St. Paul, with the exception of South Dakota and some small strips outside that State. These favorable conditions render it reasonably certain that our wholesale trade will be fairly satisfactory this fall and also in the spring.

The low price of wheat is discouraging to the farmer and affects the retail and wholesale trade, and the hostile action of Congress and the President on free wool also seriously affects considerable sections of country, but notwithstanding these drawbacks the Northwest is steadily recovering from the depression of 1893, and even the most rabid pessimist must consider that there has been large improvement during the year, and the prospects are now quite favorable for a steady growth in the future.

Prices are now so low and business interests have had so favorable opportunities for adapting themselves to these new conditions, that it seems certain now that a fairly active as well as a safe and profitable trade may be expected. This is the general feeling among our jobbers. The volume of trade is not up to that of '92, which was extraordinarily large, but, with the experience of '93 so fresh in mind, the average business man now feels about as well satisfied with his trade as he felt in '92.

The storm has cleared well away and men know pretty well where they stand and how best to tackle the future.

The weather continues exceptionally dry. Rain will now be of no benefit to present crops; on the contrary, continued rains would injure them. Yet general and heavy rains, not too long continued, would be of large advantage. Forest fires are frequent and prairie fires are much to be feared, although the latter have been very rare thus far. Rain must also fall before the farmers generally can plow for next year's crop. There have been many flying showers, which have done much good, but as yet no general rains. With their advent the situation in the



Northwest will be very satisfactory and considerably better than anticipated two months ago.

#### Omaha.

**LEE-CLARKE-ANDRESEN HARDWARE COMPANY.**—Information received from all parts of the State confirms the statements regarding the failure of the corn crops, as expressed in our last report. Much complaint is heard on all sides and despondent talk is general.

The prospects were altogether so favorable and so encouraging early in the season, the acreage of corn planted so large, that the business community had come to rely largely on the result. An abundant crop means in this section prosperity and easy times.

The total failure of crops in fully one-half of the State and a partial failure in the balance has naturally resulted in extreme disappointment.

Country merchants as well as the mass of producers are in much better financial condition to withstand the exigency of a loss of crops this year than at any previous time. For the past two or three seasons crops have been abundant, and yielded a very fair price, consequently mortgages were lifted and other obligations liquidated. This, together with various and expensive improvements, has really placed the farming community in a comparatively independent position, and in a measure fitted them for a set back such as is experienced this season.

For the past year business has been in such shape that merchants of all classes have been feeling their way cautiously, and none have been disposed to take any risks of any character whatever. Goods have been ordered only as the immediate wants of the trade demanded, and stocks of all kinds have been allowed to run down to the lowest possible limit. There is no surplus of merchandise in any part of the country.

With the above existing conditions, it is the consensus of opinion that the business interests of the country are in the best possible shape to put up with the loss of leading productions.

The passage of the tariff bill was a welcome event to business men generally, as it served to remove some of the uncertainties surrounding the business situation, though many of its provisions are not satisfactory to a majority.

As a whole, there is no doubt but what the fall trade will be light in general, but the business community are prepared for this, and it is not such a serious prospect as might be the case under more complicated circumstances.

#### Portland, Oregon.

**CORBETT, FAILING & ROBERTSON.**—Surely this is one of the years King Solomon had in mind when he wrote his remarks about "snow in summer and rain in harvest." Seldom, if ever, have the farmers been more favored than during the present season, so far as weather is concerned. The granger who gets left with grain exposed to rain has only himself to blame.

Trade still continues fair; collections are moderate, and will be for a little while until the money "to move the crop" begins to circulate.

The new freight rates on wheat from the interior to tidewater are not as low as was hoped for, but do accomplish something toward helping out some sections of our wheat growing territory. The receiver for the road probably recognizes that his first duty is to see that it earns running expenses.

The hop yield is in excess of last year's, the high price ruling then inducing farmers to go into hop raising more extensively. The price this season is considerably lower.

Under date of 20th ult. the Panama railroad and steamship lines have issued a freight tariff, quoting through rates, via ocean and Isthmus, to Portland and Northwestern coast ports. How they are to reach Portland does not yet appear, but without question the Oregon Railway & Navigation Company, being freed from their trans-continental entanglements, can now well afford to increase the business of their ocean steamers between San Francisco and Portland, as that will directly tend to build up their local traffic between Portland and the interior.

It is not probable that the new arrangement will greatly affect the Hardware trade, for the reason that so many of our supplies are purchased so far west of New York as to make the haul to the seaboard, added to the rates from New York, equal to or greater than all rail rates from the initial shipping point. In many other lines, however, the ocean route will undoubtedly do a good freight business.

#### Boston.

**BIGELOW & DOWSE COMPANY.**—Already we begin to realize the good results which are to come from an adjournment of Congress and a settlement of tariff legislation. However much one may dislike the tariff itself, like a good patient the business community prefer to take the dose, however bitter it may be, rather than to be subjected to the slow torture and doubt of the past. New England has had but a meager share of the spoils, but its manufacturers and business men accept the situation, and mills of all kinds are starting and labor is being employed. No one expects a sudden return to prosperity; its return must be gradual but sure. It will be some time before the employed will become accustomed to the new conditions. The moneys received for labor will not allow of some of the luxuries of the past, and the people will feel poor and not so ready to part with what they receive. The manufacturer will not be ready to forget his lessons in economy, and extension and expansion will be undertaken only after careful consideration. Undoubtedly the change will result in better times, but hardly in higher values or larger profits. There may be temporary advances from combinations or scarcity, but the future standard of values in the United States must approach nearer and nearer to a European basis. Looking forward, we expect September, like August, to show an improvement over last year. Any changes in prices thus far show a decline, but the fact remains that many goods are so low in price that when the demand is large enough to encourage the manufacturers to advance they will have good reasons for doing so. The only reason that the demand will be delayed is that the retail dealers feel poor. They have made no money of late, and many will trust to their jobber to look after them and let them have goods at old prices after the advance.

#### Cleveland.

**THE W. BINGHAM COMPANY.**—The improvement noted in our last still continues, and there is no doubt that the trade is beginning to assume its old-time activities. The business done in August shows conclusively that the country is very bare of goods, almost

every order being accompanied with a request to "please rush." While the quantities ordered are not so large as formerly, the assortments cover a much wider field, and the orders are more numerous; so, taken in the aggregate, the amount of goods disposed of will compare favorably with the average August trade. The exceptions are in the cities and large manufacturing towns, where factories have not yet started fully up, but inquiries for factory supplies are becoming more numerous every day, showing that the manufacturers are beginning to stir themselves and getting ready for more business. Prices remain about the same, except Wire and Nails, which have declined \$1 per ton. The drought in this section is not helping trade any, and unless we get copious rains soon it will have its effect later.

#### New Orleans.

**A. BALDWIN & Co.**—Slowly and steadily the situation is improving in this section of the country, and the number of orders we are receiving is constantly increasing from day to day, which leads us to believe that the business during the fall and spring will be much beyond our expectations. Merchants who have been buying only for their actual wants are now beginning to place their stocks in better order for a larger trade than we have had for some years. Very large crops that have been planted at the lowest cost, even though they be marketed at a lower figure than has been reached before, will still leave a small margin of profit for the planters, and trade is beginning to feel the effects of the general prosperity which is about to be realized.

The volume of business with us for July showed a decided improvement over the past two seasons.

The month of August shows a steadier improvement still, and altogether the situation is brighter than it has been for some years past.

#### Baltimore.

**CARLIN & FULTON.**—A review of the business situation since July 1 will show generally in this market, as compared with last year, increased sales, improved collections and a more hopeful feeling.

The reduction in prices from those of a year ago has had its effect in diminishing the sales in dollars and cents, but there is no doubt that there has been an increased shipment of goods which, at old prices, would have been most encouraging.

There is now, of course, on the part of many, a curiosity to know what effect the new tariff will have on prices. This can be easily surmised if not positively answered by a reference to the invoices of a year's business and a comparison of to-day's costs with those of a year ago. The reduction of values, it is easy to see, has been going on for a long time and the effects of a reduced tariff have been very largely anticipated.

We are informed that to-day steel billets are as low in this country as in Europe, and the majority of staple manufactured goods are lower to-day than they perhaps will be six months from now, provided a good demand starts up, of which there is every indication.

Certain goods, such as celebrated brands of cutlery, which had been practically prohibited under the Mc-

Kinley bill would now approximate somewhat old prices, but we do not anticipate the supplanting by foreign makers the productions of our own manufacturers, when they have secured the advantages of cheap raw material to add to their own originality of design and superiority of finish and packing.

We look for no great rush of trade, no spasmodic boom, but we do expect a general improvement, the result of a feeling that values will now be stable and that stocks, which during the agitation of the tariff had been reduced to the absolute requirements of daily consumption, can now be replenished without danger of depreciation.

With the exception of perhaps a discussion of the supplementary bills passed by the last House, it is not likely that tariff legislation will again soon disturb the commerce, foreign or domestic, of this country, and the attention of our people can now be turned most profitably to a campaign in the interest of political morality and in an effort to show that the institutions of this country are stronger than the trusts, which if they have not created, they have at least permitted.

#### Louisville.

W. B. BELKNAP & Co.—It is gratifying to note an improvement in business, more marked than anything experienced for over a year. The tariff bill result was discounted a couple of weeks before it finally became a law, and with the expectation of fair crops and the conviction that prices were at their lowest and that there was no surplus manufactured material in the country, a good healthy demand sprung up, which has been maintained. Of course there is a good deal of "slack" to be taken up, so to speak, resulting from the enforced idleness of the summer and the very greatly reduced producing capacity in operation.

But the demand, if it maintains the present proportions or increases, as may reasonably be expected as the season advances, since factories are opening and new enterprises broached, will call for part at least of the productive capacity now unused, or certainly so much of it as is favorably situated to make goods at the lowest possible price and to distribute them at minimum cost.

The Ohio Falls Car Works here (or just across the river at Jeffersonville) have secured the Pennsylvania contract for 500 cars, and consequently the Ohio Falls Iron Works of New Albany have secured the order for the iron. With these two large local concerns at work, the outlook is much improved for the laborer.

One specially encouraging feature of the demand is the fact that it is not confined to farm supplies or constructive material, which has been the mainstay of business of late, but many tools are being sold which people do not buy for anything but actual use in hand. When a man pays for a new Hatchet or Saw, we are confident that it is going to be immediately used and not hung up for future reference.

In short, everything points to better times or more active business at least, at established prices. It may be some time before we should be able to mark advances of any size.

There is confessedly a scarcity of goods in many lines, factories are slow in filling assorted orders or large ones. Delay at the factory is most amply seconded by delay in transit. The railroads were never more slow or un-

satisfactory in their deliveries than at present and the railroad tracer is the most numerous document of the day.

In local financial circles the release of large quantities of whisky from bond was most noteworthy, the revenue paid in here to the Government in a week or ten days was between \$3,000,000 and \$4,000,000.

#### Philadelphia.

SUPPLEE HARDWARE COMPANY.—

At Last! Notwithstanding that the chances are that others may touch on this same subject, we feel inclined to give vent to the above expression concerning the new tariff bill, which has become a part and parcel of our laws since our last report. A bill which, if picked to pieces, would be the choice of none, but nevertheless we feel the choice of all in preference to the uncertainty and tariff tinkering we have been doctored with for months past.

Fortunately during the month of August, more especially during the latter part, a slight improvement over the corresponding period of past years' specifications that our representatives had been sending in is noticeable.

While the orders fail to show that snap in business we have looked for, still we can see a call for a more general line of goods. The proportion of seasonable goods, however, is greater than during years of general prosperity, Builders' Hardware, Mechanics' Tools, &c., at such times being in more general demand.

Prices seem to be holding their own, an exceedingly small number of changes being noted, and changes that are being for small lines and specialties.

One encouraging local sign with us is the renewed activity at the shops of the Baldwin Locomotive works. In departments where hours of work for some months past have been from eight until four p. m., and then for an average of about three days a week, the past week has seen increased forces at work full time daily.

It may be only a slight sign of improvement, but certainly an encouraging one to note.

Collections on the average have been fair.

### Notes on Prices.

Wire Nails.—There continues to be a good demand for Wire Nails, and the aggregate of business during the past week has been fair. Some of the large buyers have been placing orders, but a good proportion of the business is from comparatively small houses, who are purchasing in moderate lots. Quotations for carload lots at mill are on a basis of \$1 to \$1.05, the former figure being obtainable on good orders. Small lots from store in New York are quoted at \$1.25.

Chicago, by Telegraph.—Transactions are very much more numerous and while the volume of business is possibly still below the total production of all the factories in operation, yet inquiries are of such a character that the trade may be expected shortly to take the entire output. Thus far there has been no speculative buying. Some little irregularity has been noted in prices owing to efforts to market job lots of Nails not made by the standard mills,

but the trade in general has not been affected and prices are steady at \$1 at Ohio mills. Chicago rates are \$1.10 to \$1.15 for factory lots. Jobbers quote small lots from stock at \$1.15.

Cut Nails.—A fair business is doing in Cut Nails, the price remaining substantially as at our last report. The Eastern market is represented by the quotation of 90 to 95 cents for carload lots on dock. The store price in New York for small lots is \$1.05 to \$1.10.

Chicago, by Telegraph.—The Lakeside factory was obliged to shut down on account of a fire which destroyed a portion of their boiler house, but the works will soon be running again. The month of August appears to have been quite a fair month for the local trade. Orders were not large but steady, and business will probably continue running in the same way during the current month. Factory lots are quoted at 95 cents, Chicago, for 60 cent average, and small lots from stock at \$1.10 to \$1.15.

Barb Wire.—The Barb Wire market continues without special features, the demand being moderate and prices steady. The market is represented by the following quotations for Four Point Galvanized, delivered at the points named: Pittsburgh, \$2 to \$2.05; Cleveland, \$2.05 to \$2.10; Cincinnati, Allentown, Chicago, or New York, \$2.20 to \$2.25.

Chicago, by Telegraph.—Mail orders show a steady increase on manufacturers' desks. These are generally small, but here and there a country merchant is found with sufficient faith in the future to purchase 50 to 100 tons. Prices show no indication of weakness. It is the opinion of the trade that the manufacturers are working more harmoniously than at any time in the past. Jobbers report a fair demand from stock. Prices are still quoted at \$2.35 for small lots of Galvanized, with 10 cents off for carloads.

Major's Ice Float.—This device was described in our last issue as put on the market by A. Major, 232 William street, New York. The Float is sold to the trade at the following net prices:

	Each.
For Coolers 6, 7 and 8 inches in diameter.....	\$1.00
For Coolers 9 and 10 inches in diameter.....	1.25
For Coolers 11 and 12 inches in diameter.....	1.50
For Coolers 13 and 14 inches in diameter.....	2.00
Larger sizes are sold at proportionately higher prices.	

Glass.—It is reported that at a conference held in Pittsburgh on September 3 between the Western Window Glass Manufacturers' Association and the Glass Workers' Wage Committee a scale of wages was agreed to for the season of 1894-95. According to the report the workers accept a reduction of 22½ per cent. in wages from last year's scale, the reduction being necessary to meet the lower tariff. It is stated that the settlement will apply to

the Eastern Glass plants as well as to these in the West, and that factories will be started immediately. There has not been any change in quotations up to the present time. Plate Glass factories have been in operation for the past three months with a fair demand for their product. It is too soon to decide whether the reduction of duties will have any immediate effect upon prices of Plate Glass in the Eastern markets. Pittsburgh quotations on Window Glass are as follows: Single strength 85 and 5 per cent. discount; double strength 85 and 10 per cent. discount. Plate Glass is quoted at 70 to 70 and 10 per cent. discount from Eastern list, according to the size of Glass, and from 70 and 5 to 60 and 20 per cent. discount from Western list, according to size of Glass.

### The Hardware Club.

**A**T A SPECIAL MEETING of the Board of Governors of the Hardware Club of New York, held Friday, August 31, the following gentlemen were elected members:

STEPHEN B. ALLER,  
111 Liberty street, New York.  
WILLIAM L. BRIGGS,  
25 Murray street, New York.  
ANTHONY H. CREAGH,  
Metropolitan Life Insurance Company, New York.  
WILLIAM ERDTMANN,  
Equitable Life Assurance Society, New York.  
CHARLES P. FRALEIGH,  
261 Broadway, New York.  
FRANK W. GARVIN,  
Garvin Machine Company, New York.  
PAUL GOEPEL,  
280 Broadway, New York.  
FRANK W. GOODWIN,  
Bradley & Hubbard Mfg. Company, New York.  
W. W. HALLOCK,  
Tribune Building, New York.  
CHARLES MATTHEW MARVIN,  
261 Broadway, New York.  
JOHN W. MASON,  
142 Duane street, New York.  
WILLIAM P. MASON,  
142 Duane street, New York.  
H. T. PATTERSON,  
Patterson, Gottfried & Hunter, New York.  
ALFRED B. SCOTT,  
415 Pearl street, New York.  
FRANK H. THOMPSON,  
Stanley Rule & Level Company, New York.  
DONALD B. TOUCEY,  
261 Broadway, New York.  
WILLIAM H. WOOLWORTH,  
New York Transfer Company, New York.

The Chief of Naval Ordnance has postponed the test of small arms for the navy until October 1, owing to the weapons of the competing manufacturers not being ready on September 1—the day originally fixed for commencing the trials.

## The New Tariff on Cutlery.

**T**HE QUESTION as to the effect of the new tariff on Cutlery is one of a good deal of importance to the trade, as in some lines important changes are made which will result in reductions in prices. Others are, however, unaffected directly by the new law. What the course of the market in the matter of foreign costs will be cannot be foretold, but some importers, as well as American manufacturers, are anticipating an advance on the other side which will have the effect of preventing some goods from being as much reduced in price as would otherwise be the case. The disposition of importers to hold goods at a somewhat larger margin of profit than has recently been realized will also have some influence in preventing the trade from receiving at once the full benefit of the diminished duties.

### Shears and Scissors.

In these lines of goods no change will result from the revised tariff, the duty being the same as under the McKinley bill, namely, 45 per cent. ad valorem.

### Razors

It is not expected that the prices of Razors of good quality will be materially affected by the new bill, on which there is simply an ad valorem duty of 45 per cent., instead of a specific duty of \$1.75 per dozen and 30 per cent. ad valorem in the McKinley bill. Cheap Razors, however, will probably be sold at somewhat lower figures, as under the new bill they are subject to a duty of 45 per cent. ad valorem, instead of 30 per cent. ad valorem and \$1 per dozen under the McKinley bill.

### Pocket Cutlery.

The changes made in the duties on Pocket Cutlery are quite radical and indicate reduced prices on all goods. It is impossible to express these reductions by a general percentage, as the reductions will be greater on some goods than on others. For example, on the very cheapest goods, those costing abroad not exceeding 30 cents per dozen, the new duty is 25 per cent. ad valorem, instead of 12 cents per dozen specific and 50 per cent. ad valorem under the McKinley tariff. Under the former law a Knife costing abroad 30 cents per dozen called for a duty of 27 cents, making a total of 57 cents (foreign cost and duty), while the same Knife now is subject to a duty of only 7½ cents, making a total of 37½ cents, a reduction of 33⅓ per cent. On the high priced goods, the foreign cost of which is more than \$3 per dozen, the percentage of reduction in duty will depend on the value of the Knife, as this class of goods is now subject to a simple ad valorem duty of 50 per cent. instead

of a specific duty of \$2 per dozen and an ad valorem duty of 50 per cent. Under this provision all goods costing abroad \$3 or more can be imported at \$2 per dozen less than heretofore, permitting a large proportionate reduction in the prices of goods costing abroad \$3 or a little more, while on the finer and more expensive goods the proportionate reduction will obviously be less. On goods, the foreign cost of which is 50 cents per dozen or less, a reduction of nearly 15 per cent. is permitted by the new tariff, and on many of the medium priced goods a reduction of from 15 to 25 per cent. may be made.

It is not, however, to be expected that the prices of Pocket Cutlery will immediately show so large reductions as the above figures might suggest, as there are several influences which may tend to prevent so marked a decline, and importers express the opinion that the reduction in the price will be about 10 to 15 per cent. It is thought not unlikely that foreign costs will be advanced, especially in view of the fact that when the McKinley bill went into operation reductions were made in many cases in wages, which it is thought may again be advanced on such goods. The foreign manufacturers also have undoubtedly in some cases been selling certain patterns at exceedingly close margins, and they will be prompt to advance their prices as soon as the condition of the market here will permit it. For these reasons well informed manufacturers on this side, as well as importers, consider it not unlikely that somewhat higher prices will prevail on such patterns of Pocket Cutlery as were forced down in price under the McKinley tariff. It is also thought that some improvement in the quality of imported goods may result. There is no doubt that when the McKinley bill went into operation many patterns of Pocket Knives were cheapened at the expense of quality, the general appearance and style being retained so successfully as to deceive the trade. Under the new law importers consider it probable that such economies, which were in a sense necessitated by the McKinley law, will be in many cases discontinued and better goods turned out. It is also expected that there will be a relatively larger quantity of fine Pocket Cutlery imported than has heretofore been the case.

Another influence which will operate against as heavy a reduction in the price of the goods as might otherwise be the case is the fact that the importers who have stocks of goods on hand will naturally be disposed to sell them at as remunerative prices as possible, and while prices on all imported Pocket Cutlery will be marked down, it is not to be expected that the trade will be given the full benefit of the reductions permitted on new importations by the revised tariff, especially in view of the fact that the importers have more or less goods on hand which were brought in under the higher duties of the old law. While

the stocks of Cutlery in importers' hands are not heavy, this consideration will have some effect in keeping up the price for the present. There is also some difficulty experienced in getting goods through the custom house at the present time, on account of the congested condition of things there owing to the enormous quantities of goods which are being entered. There is also a quickening in the demand for Cutlery, and importers who have goods in stock are holding them with some firmness. It should also be remembered that in anticipation of the reduced tariff on this line of goods importers have for some time been working down their stock as much as possible, and in order to accomplish this have been shading their regular prices, so that in many cases the figures which during the past few months have been made in Pocket Cutlery are lower than were justified by the cost of the goods under the McKinley tariff, and in such cases should not be taken as a basis for estimating prices under the new tariff.

#### Table Cutlery.

It is not thought that the new tariff will have an important effect on the Table Cutlery market, which is firmly held by the American manufacturers. Importers refer to the new duties as perhaps helping them a little on the medium grades, but it is not at all likely that foreign Table Cutlery will come in in any large quantities or that any important changes in the price of domestic goods will result from the new duties.

#### Outside Business.

"THIS is the last time I will ever interest myself in any outside business, and I will never loan another dollar to any one, be he friend or stranger, unless good collaterals are placed in my hands."

The speaker was a middle aged Hardware jobber, who had just been telling us of his losses in connection with a recent failure of considerable prominence.

"I had unlimited confidence in the honor of the man at the head of that concern," he continued. "I stood by him long after his credit was gone with others, and as a consequence I am just so much more a loser. I have had my fill. Hereafter I will attend strictly to my own business, and the man does not live who can get a dollar from me, except on good collateral. It does not do to bank on friendship, honor or confidence. Good collaterals will be good enough for me hereafter."

Almost every successful man sees the hour when he is ready to say, and does say, just what we heard above. If he is making more money than he needs in his own business his instinct leads him to use his surplus elsewhere at a profit. He has his favorite investment stock, or quietly buys notes or loans to others.

For a time dividends come along pleasantly, loans are repaid with inter-

est and he is pleased at his outside income. Then come offers to take stock in new enterprises, always pictured in the most rose colored light, or a man in whom he has unbounded confidence wants a little help. The monied man subscribes for some stock, he lends money to his friend, only to find that it is necessary to take more stock or lend more cash to save what was first invested, and in the end to lose all.

Then follows the reaction. He is ready to vow, and does vow, that never again will he take stock in anything, and will lend no money unless secured by Government bonds. He usually keeps his vow, and the result is that a great many good things pass by his door, but they tempt the man that has not yet had this experience, while he pities the conservative fellow down the way who turned his face against so good a thing.

In this way history continually repeats itself. Not all the new ventures, however, prove failures, nor is every loan a loss. If they were business would come to a standstill. The new company that Conservatism would not even consider is not infrequently the one that enriches all who entered it at its commencement, and the effect of one such brilliant success in the business world will outweigh many failures.

Yet the constant experience of the vast majority of successful business is embodied in the homely old proverb, "Shoemaker, stick to your last!"

#### Trade Items.

J. B. KRUG & CO., have established themselves at 88 Chambers street, New York, and will represent the following manufacturers, we are told, as agents for New York and nearby trade—viz.: C. Hammond & Son, Hatchets; William Schmitt, Mechanics' Tools; Eugene Conard & Sons, Handles and Mallets and Irwin Auger Bits. A stock of the goods will be kept on the premises for immediate delivery. Mr. Krug has been 12 years with the firm of F. R. Emmons & Bro., 21 Warren street, we are informed.

KEYLESS LOCK COMPANY, Indianapolis, Ind., manufacturers of Cabinet Locks and Post Office Outfits, have opened a New York headquarters at 88 Chambers street in charge of J. L. Clough, vice-president and Eastern manager. This office will look after the trade in the Eastern, Middle and South Atlantic States east of Pennsylvania, the latter included. The Locks made by this company are of brass and have two dials, each of which has 24 letters. The space between each letter is again divided into four parts, making in all, it is said, a total of 9216 possible combinations.

CAMPBELL ELECTRICAL SUPPLY COMPANY, Boston, Mass., manufacturers of Century Wire, Paint and Tapes, &c., have now a New York office at 88 Chambers street, under the management of Charles A. Newton. This branch will care for the company's interests in New York and parts of Connecticut, New Jersey and northern Pennsylvania. Among a number of specialties handled by this concern may be mentioned Feeder Wire and Cables, Line Wire, Rubber Wire, Underground and Submarine Cables, Insulating Paints, &c.

SAMUEL A. HAINES of S. A. Haines Company, Indianapolis, Ind., returned to this country on the "Furest Bismarck," August 31, from a business trip to the United Kingdom and continent of Europe, begun July 2 last. He went over in the interest of a number of manufacturing concerns represented by his company, including among others Eclipse Bicycle Company, Dille & McGuire Mfg. Company, The Irwin Auger Bit Company and Hatch Cutlery Company. He expresses himself as satisfied with the business accomplished and believes the door has been opened through which to increase the volume of their export trade. He received an order by mail for goods on his arrival which he thinks came on the same steamer, in addition to another order awaiting his arrival for Bicycles for the Russian market.

BRANSON & NEAR, Cleveland, Ohio, and New York, have changed their address, and are now located at 35 Warren street, New York. Among other goods they are representing the Bread and Cake, Paring and Coring Knives manufactured by Chas. F. Sperry & Co., St. Louis, Mo.

#### Cooking by Electricity.

It is stated that the ratio of cost of heat for cooking purposes as delivered from central electric stations by means of electrical appliances, which convert electricity into heat at any point desired, has been reduced until it now compares with heat produced by burning coal in cooking ranges as seven to four. That is to say, heat for cooking can now be obtained from electrical currents at somewhat less than twice the cost of ordinary fuel used for the same purpose. Probably this estimate is only justified by taking into account the heat wasted in getting coal fires into condition for cooking and that which also wastes while the fire is going out. The advocates of the newer method hold that electricity is hereafter to be a more or less formidable rival to gas for summer use in cooking. Although with the modern improved gas stoves most excellent work in all kinds of cooking, from broiling to baking, is possible, there are those who have used both systems who confidently assert that, as compared with results obtained in electric cooking, gas is inferior. If this assertion be true (which many who have used gas stoves will hardly think possible), it can only be accounted for by the accurate regulation of temperature which electric heating apparatus permits. Yet the temperature of ovens in gas stoves can now be regulated with such precision as seemingly to leave nothing further to be desired, and hence we are disposed to discredit statements as to the great superiority of electric cooking as compared with that done in gas stoves. It is hardly possible that in point of cleanliness the electric cooking apparatus can exceed in any notable degree the best types of gas stoves, since all the dirt that accumulates about either of them results from drippings from the articles cooked upon them, these being more or less according as the operator is careful or otherwise. There is, seemingly, a tone of exaggeration in many of the statements made and published with reference to electric cooking. Probably these are attributable partly to the zeal of those who are commercially interested in the manufacture and sale of electric cooking apparatus, and partly to the enthusiasm of those whose interest in a novel method somewhat beclouds their judgment.

## Hardware Curios.

THE ACCOMPANYING ILLUSTRATIONS represent some of the old time Hardware in the possession of H. C. Wiseman of

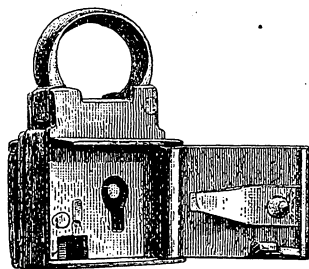


Fig. 1.—Hand Wrought German Padlock.

the Springfield Hardware Company, Springfield, Ohio, who for a number of



Fig. 2.—An Old Time Pocket Knife.

years has gathered together any quaint pieces of old Hardware that have come in his way.

The iron hand-wrought German Padlock of 70 years ago, shown full size in Fig. 1, has a spring door covering the key hole, making it a secret Lock. It is in as good condition as

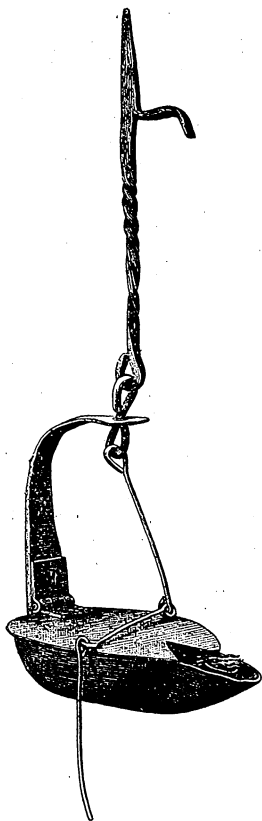


Fig. 3.—Grandmother's Best Lamp.

when made, and was brought to this country on a German chest nearly 60 years ago.

The old time Pocket Knife shown in Fig. 2 measures  $6\frac{1}{2}$  inches in length with the blade open, and has seen

nearly 100 years of service, according to its former possessor. The blade is of wonderful temper, and the Knife is still in very good condition.

shown in Fig. 6, which is as curious as the Lock itself. The Key in Fig. 7 measures  $7\frac{1}{2}$  inches in length, and the ring handle 4 inches in diameter. The

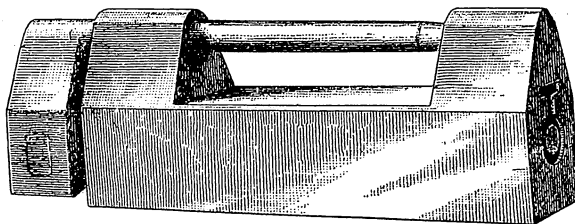


Fig. 4.—Chinese Brass Padlock.

The old wrought iron dip Lamp will be recognized by many who were in business half a century ago. This is one of half a dozen Lamps taken from an old stock of Hardware two years ago in the original package, and had

Key controlled the front door Lock to an ancient business block for a long series of years and until the block was replaced by the handsome bank building which now covers the ground.

The little screw barrel Gun, measuring 5 inches over all, as illustrated in Fig. 8, dates back to 1845, and is still good for muzzle loading service. It was taken from a tramp lodged in a station house nearly 15 years ago and is one of a number still in existence. Included in this collection of old time Hardware is a 6 x 10 inch rim Door Lock; Lull

been handed down in the one store for nearly 50 years.

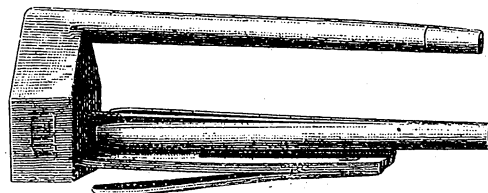


Fig. 5.—Shackle of Chinese Padlock.

Figs. 4, 5 and 6 represent a genuine Chinese Padlock, a veritable curiosity & Porter Blind Hinges, weighing 8 pounds to the single pair; Wood

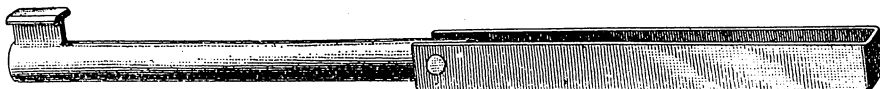


Fig. 6.—Key for Chinese Padlock.

in shape and mechanism, but embodying good mechanical principles in construction. The Lock was bought from a Chinaman some years ago, being

Screws made without gimlet points; a United States Mail Lock of 1829, with

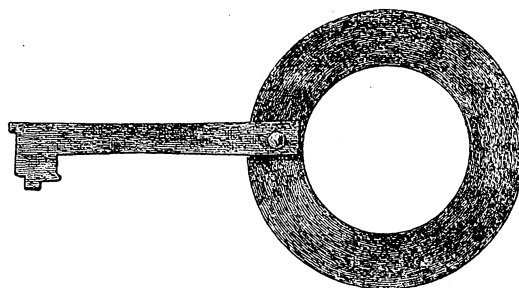


Fig. 7.—An Ancient Key.

five tumbler inside brass work, and some old Pistols, among which is one



Fig. 8.—Screw Barrel Self Cooking Pistol.

taken from his chest directly after landing. It has a folding key, as with the words "Deringe, Philadelphia" stamped on the lock and barrel.



## Letters from the Trade.

*Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.*

A reader of *The Iron Age* relates the following incident showing why a gentleman representing a number of manufacturers refused to cut the price upon a line of goods, the selling price of which was left discretionary with him:

An offer was made by a buyer for a good sized bill of goods at 5 per cent. discount below the regular price, which the representative refused to accept, as he did not believe the manufacturer could fill the order at the price offered and make any money after paying the commission for selling. It was apparent that the buyer would expect the same price on all subsequent orders for the same goods, besides claiming a rebate on bills of the same goods which were still unpaid. Then again other manufacturers would meet the cut price as soon as they learned of it, and thus demoralize the market.

The representative believes more injury has been done to the Hardware trade by manufacturers or their selling agents making cut prices, which soon become permanent prices, for the sake of obtaining orders, than in any other way.

### Fishing Tackle.

A Western retailer thus writes in regard to the desirability of Fishing Tackle being handled by Hardware merchants, and at the same time refers to some of the features of this class of trade:

I am surprised that so few retail Hardware dealers make a push on Fishing Tackle. There is a disposition to leave this branch to the gunsmith, but in my opinion it is a great mistake.

The time was, and not so very long ago, when an ordinary stock of Tackle for a retail store consisted of a few cheap lines, a few boxes of common hooks, some sinkers and floats. A bill that ran up to \$5 was a very good one.

But the growth of the idea of summer vacations and the greater interest taken in all outdoor recreations have led to the increase of fishing to a wonderful degree and has made Tackle an important item.

Twenty-five years ago the man with a jointed rod was a rarity, now the very smallest boy has to have one. The angle worm of our boyhood has given way to the minnow and fly and to all manner and kinds of artificial baits. Nothing in hooks used to be known but a Limerick, but now the young fellow talks about Carlisle, Sproat and Cincinnati Bass hooks with the same air that he discussed the best brand of chewing gum.

Prices in what used to be luxuries (Rods and Reels) have dropped down faster than almost any item in our line. The factories sell a three-piece ash rod for 75 cents per dozen. The result of this has been to about kill our trade in Japanese and Calcutta bamboo poles. We buy a plain Reel at 60 cents per dozen. None of us imagined ten years ago that we would see prices touch these figures—a jointed Rod and Reel to cost us 11 cents.

Lines have dropped in proportion, so that we can sell a braided Line for a nickel.

In the matter of artificial baits prices are also phenomenally low. We buy a good plated Spoon Hook with fly at 5 cents. Rubber Minnows are down to 22 cents.

Now, with these low costs, and the spirit among men and boys to have good tackle, there is nothing in a Hardware store that will better pay for the work put into it than this line.

The person who is going fishing wants to catch some fish. He knows that fish are creatures of whim and fancy. What they eagerly bit at yesterday they will not touch to-morrow. Consequently it is comparatively easy to coax a man who is going fishing into trying a wider variety of baits than he intended, and it will be still easier to do this the next time he calls, for he will see others catching more fish than he succeeds in capturing, and ten chances to one he gives all the credit to the particular hook or bait they used.

It is a pleasant business. It is at its best in the hot summer months when other branches are dull. The fishermen of the town include the very nicest people there, and they are pleasant customers to trade with. Above and beyond this is the fact that it pays, and pays handsomely.

If stock is carried over it is just as salable a year from now, and the judicious buyer will remember that it is easy to replenish, and need not invest very heavily at the start. The trade belongs to the Hardware line. If you are not "in it" you are making a mistake.

### A Home Made Bicycle.

F. LAWRENCE of Sheboygan, Wis., has arranged in one of his show windows a Bicycle and rider composed of Hardware articles, which attracted a great deal of attention. In construction it is similar to "Household Wants, '95 Model," illustrated in *The Iron Age*, July 26, 1894. Two grindstones compose the wheels of the machine; shovels, an axe handle and hay fork form the frame and seat; a drawing knife serves for handle bar; pedals are of meat cutter handles; trace chain for chain, and a common bull's eye lantern is used for the head light. The rider has stove pipe legs, feet of scoops and pint cups; body of three wash basins, a pail, pie plate, scoop and a two quart pan; arms of conductor pipe, with scoops on the shoulders for epaulets; weeders for hands; two quart pans for a face, with can screws for eyes, coffee pot spout for nose and half of a patty pan for a mouth.

### Price-Lists, Circulars, &c.

THE WILLIAM SCHOLLEHORN COMPANY, New Haven, Conn., for whom Julius Berbecker & Co., New York, are agents: Shears, Scissors and Pliers. An illustrated catalogue and price-list show lines of Star Scissors and Shears; also Star Pruning Shears, together with a line of Elm City Shears. The Bernard Pliers are illustrated in a variety of styles and sizes; also Folding Dividers and Pencil Holders, the latter to be attached to Compasses. The manufacturers have enlarged their facilities with improved machinery and Tools.

THE YALE & TOWNE MFG. COMPANY, Stamford, Conn., and New York: Chain Blocks. A circular gives a comparative price-list of three varieties of Blocks—Weston's Differential, Duplex Screw and Triplex Spur Gear, up to 2 tons' capacity.

BUFFALO WIRE WORKS, Scheeler & Sons, Buffalo, N. Y.: Wire Chairs and Settees. A circular illustrates Settees and Chairs made of wrought iron, wire and malleable iron. The point is made that they are lighter, stronger, more durable and ornamental than the regular cast iron or wood, the former being easily broken by frost or by falling over.

WILLIAM FRANKFURTH HARDWARE COMPANY, Milwaukee, Wis.: Fall Price Current of Hardware, Novelties, House Furnishing Goods and Cutlery. The book, containing 79 pages, illustrates, with list prices, Skates, Oil Heating Stoves, Corn Knives and Huskers, Apple Parers, Meat Cutters, Oil Cans, Axes Wood and Cross Cut Saws, Hay Knives, Snow Shovels, Lanterns, Lamps, Ammunition, Butcher Knives, Scissors, &c.

THE CHICAGO STAMPING COMPANY, Congress and Green streets, Chicago: Illustrated circular of Oil Cans. The styles shown are the Chicago Oil and Gasoline 5-gallon can, made of galvanized iron with a colored label lithographed on the iron, and provided with a faucet; the Rival, which is the same Can, made with a spout; plain galvanized 5-gallon Cans, with faucet or spout; the Rex 1-gallon Can, with galvanized top; the Queen 1-gallon Can, with tin top; the Beauty 1 gallon Can, made of sheet steel, japanned in colors, and tin Oil Cans of ½ gallon to 2-gallons capacity.

### It Is Reported—

#### California.

That Robert Moore of LEMOORE recently suffered damage from fire. The loss on building is estimated at \$1200, with insurance of \$800; and the loss on stock at \$2800, with insurance of \$2000.

#### Connecticut.

That Charles B. Holcomb of TARIFFVILLE has moved his Hardware and Stove business to the Bolles Block on Main street.

#### Florida.

That C. F. Hamblen, Hardware, &c., St. AUGUSTINE, will soon take possession of his new establishment on Hospital street.

That the Builders' Supply Company of St. AUGUSTINE have increased their capital stock from \$25,000 to \$50,000.

That the Upson Hardware Company of WINDEMERE will establish saw and planing mills.

#### Illinois.

That fire broke out on the night of the 29th ult. in the Hardware and Implement building of James Fowley, COBDEN, destroying it completely.

That Allen, Myers & Co., ROCK ISLAND, have been incorporated, with a capital stock of \$10,000, to conduct the Hardware, general construction and contracting business. The incorporators are Edward M. Allen, William Myers and Frederick B. Myers.

#### Indiana.

That the Hardware store of James & Combs, JONESBORO, has been disposed of to Lee Davison.

#### Iowa.

That A. E. Rea of CORYDON has purchased J. W. Young's Hardware store at MEDIAPOLIS.

That Geo. Haw & Co. have commenced the erection of a new store at OTTUMWA. The building will be 44 feet wide, four stories high and over 100 feet in length.

That M. Maher & Son, SABULA, JACKSON COUNTY, are contemplating raising part of their Hardware store and making it two stories. They will also put in an elevator and move their tin shop to the upper floor. Their increasing trade requires this enlargement of their facilities.

That H. S. Hunter of PLAINFIELD has taken possession of his new Hardware building. The new quarters are handsome and commodious.

That Townsley & Moore of OAKLAND have removed to new quarters in that place.

That fire destroyed the building and part of the stock of Hardware of Chandler & Barren, ESTHERVILLE, on the 22d ult. The loss is \$5000, covered by insurance.

That Haynes & Stevens, WILLIAMS, have bought the Hardware stock and building of Gerber & De France, and have taken possession.

#### Kansas.

That John Brunny will soon open up a Hardware store at FORT SCOTT, having severed his connection with the Warn Hardware Company.

#### Massachusetts.

That H. A. Chapman & Co., Hardware and Tin, FITCHBURG, have sold out to Milton A. Lackey & Co.

#### Michigan.

That S. Gaubatz has opened a new Hardware store in the Pomeroy Building on River street, MANISTEE.

#### Minnesota.

That the copartnership now existing between John Karst and John J. Karst, under the firm name of the Eagle Hardware Company, STILLWATER, will be dissolved on January 19, 1895.

That J. B. Rossman, Hardware dealer at HAMLINE, recently had a fire loss.

That H. C. McLean has sold his interest in the Hardware firm of McLean & Hamlin, at LAKE CRYSTAL, to Andrew Hamlin. The firm will hereafter be known as E. C. Hamlin & Co.

#### Mississippi.

That William Jenkins has sold his large Hardware store at OXFORD to the Oxford Mercantile Company, composed of Benjamin Price, David Carter, D. L. Sultan, Andrew Owen and others.

#### New York.

That George P. Brand & Son is the style of a new Hardware concern at SILVER CREEK.

#### North Dakota.

That R. S. Timmins is now running two Hardware stores at HARLEM.

#### Ohio.

That Church & Weld's Hardware store, at MARYSVILLE, was robbed on the 23d ult.

That Kennedy & Garver are soon to enter the Hardware business at COLLEGE CORNER.

#### Rhode Island.

That the John D. Sawyer Company, PAWTUCKET, have been succeeded by the Sawyer Hardware & Supply Company. The business will be conducted under the same management as heretofore, with John D. Sawyer as general manager.

#### South Dakota.

That S. B. Simonson is closing out his Hardware stock at VERMILLION.

#### Tennessee.

That the new brick storehouse of Brown & Greer, on Court House Square, LOUDON, is nearly completed.

That Miner & Sprague is the name of a new Hardware store at WINCHESTER.

#### Texas.

That George A. Morris, trustee, has sold the J. R. Morris Sons' Hardware stock, at HOUSTON, to Mrs. H. C. Morris for \$26,500. The sale includes also the fixtures in the store. The business will be continued by a corporation to be known as the J. R. Morris Hardware Company.

#### West Virginia.

That Greer & Laing of WHEELING have been incorporated under the style

every  $\frac{1}{4}$  inch of its length, while the screw fills in the finer measurements. It is explained that from 4 inches to  $11\frac{1}{4}$  inches requires three extension rods. For lengths above  $11\frac{1}{4}$  inches an extension sleeve is screwed on to the micrometer head providing for a greater range to telescope longer rods and requiring less of them, four from  $11\frac{1}{4}$  inches to 30 inches, two of which are made to couple together, thus taking less room. A binding screw locks the



Starrett's Inside Micrometer.

of Greer & Laing Company. The authorized capital is \$500,000. The incorporators are Alexander Laing, Barkley Cooper and Charles Tracey of Wheeling, Jacob R. Greer of Pasadena, Cal., and David B. McIlwaine of New York City.

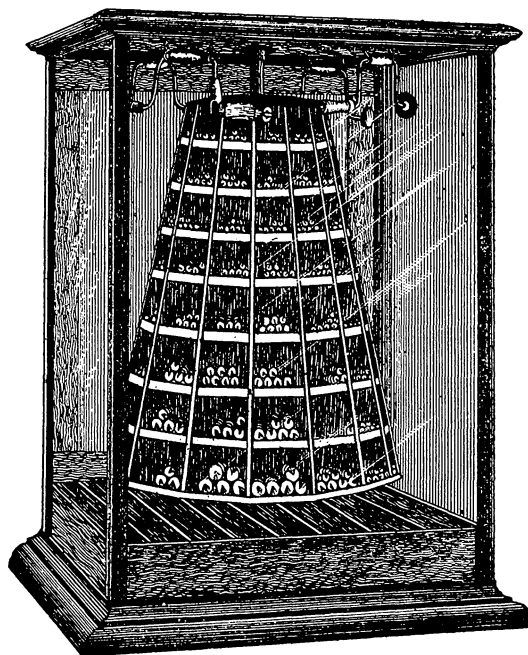
*The Hardware trade throughout the country are requested to report business changes, improvements and other matters of trade interest suitable for mention in this department.*

#### Starrett's Inside Micrometer.

The accompanying cut represents an inside micrometer, put on the market

#### Herrick's Auger and Auger Bit Case.

The accompanying cut represents a case for holding augers and auger bits, offered by F. A. Herrick & Co., Jackson, Mich. The case is made and finished in antique oak, with glass sides. The revolving pyramid for holding bits is made of sheet iron and Georgia pine; the iron being japanned and the wood oiled and varnished. Large bits are accommodated at the bottom and



Herrick's Auger and Auger Bit Case.

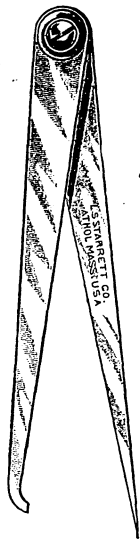
by the L. S. Starrett Company, Athol, Mass. The instrument is designed for micrometer measurements reading  $1000$  with  $\frac{1}{4}$ -inch movement of the screw. V-shaped grooves are cut in the measuring rods accurately spaced  $\frac{1}{4}$  inch apart, and the rods are held in the micrometer head by a spring pin fitting the grooves, giving a standard starting point for

smaller ones above. There are 128 bins, holding 768 augers and various kinds of bits, designed to hold the following kinds and quantities of each: Nut augers, one-half dozen each, from  $\frac{1}{4}$  inch to 2 inches; Russell Jennings or other bits, one half dozen each, from  $\frac{1}{8}$  to  $1\frac{1}{8}$ ; common or other bits, one-half dozen each, from  $\frac{1}{8}$  to  $1\frac{1}{8}$ ; Syra-

cuse bits, one-half dozen each, from  $\frac{1}{8}$  to  $\frac{1}{4}$ ; twist drill bits, one-half dozen each, from  $\frac{1}{8}$  to  $\frac{1}{4}$ ; double cut gimlet bits, one-half dozen each, from  $\frac{1}{8}$  to  $\frac{1}{4}$  and German gimlet bits, one-half dozen, from  $\frac{1}{8}$  to  $\frac{1}{4}$ . Also four bins for reamers of different kinds and sizes; four bins for screw driver bits; four bins for nail sets; four bins for countersink bits; four bins for solid punches; four bins for belt punches and 18 bins for other kinds of bits, &c., not already enumerated. Gummed labels are furnished to put on the front of each bin, whereby the size, kind and price of bits may be marked by the dealer. The manufacturers claim that the bits being inclosed do not get soiled or rusty, that the case solves the problem of how to keep a well assorted stock of augers and bits in the smallest amount of space, displaying them to the best advantage, and that when filled the case presents an attractive appearance, and certainly will increase sales.

#### Starrett's Hermaphrodite Calipers.

The L. S. Starrett Company, Athol, Mass., are offering firm joint calipers, as shown herewith. The caliper has the improved joint of the company's No. 26 outside and No. 27 inside calipers. The joint is so made as to be drawn together by means of a screw forcing a washer on to a squared end of the main



Starrett's Hermaphrodite Calipers.

rivet, which extends through the legs, thus clamping them together between bearings so shaped, it is stated, as to insure a smooth and uniform friction of more or less tension, to suit the user. The point is made that the quality of these tools is superior to that of old style riveted joint calipers.

#### The McCabe Ball Bearing Tubular Door Hanger.

The McCabe Mfg. Company, 256-257 Broadway, New York, are offering the hanger and track illustrated in the accompanying cuts. Fig. 1 illustrates the hanger, track and door plate. The tube or track is made from one piece of turned steel, with an opening at the bottom, with a bracket for holding the track. After the brackets are screwed to the spreader, Fig. 2, the track is inserted in the brackets so that the hole

in the center of the tube admits of the insertion of a screw driver to raise or

The ball, Fig. 1, is composed of two hemispherical cones, between which is

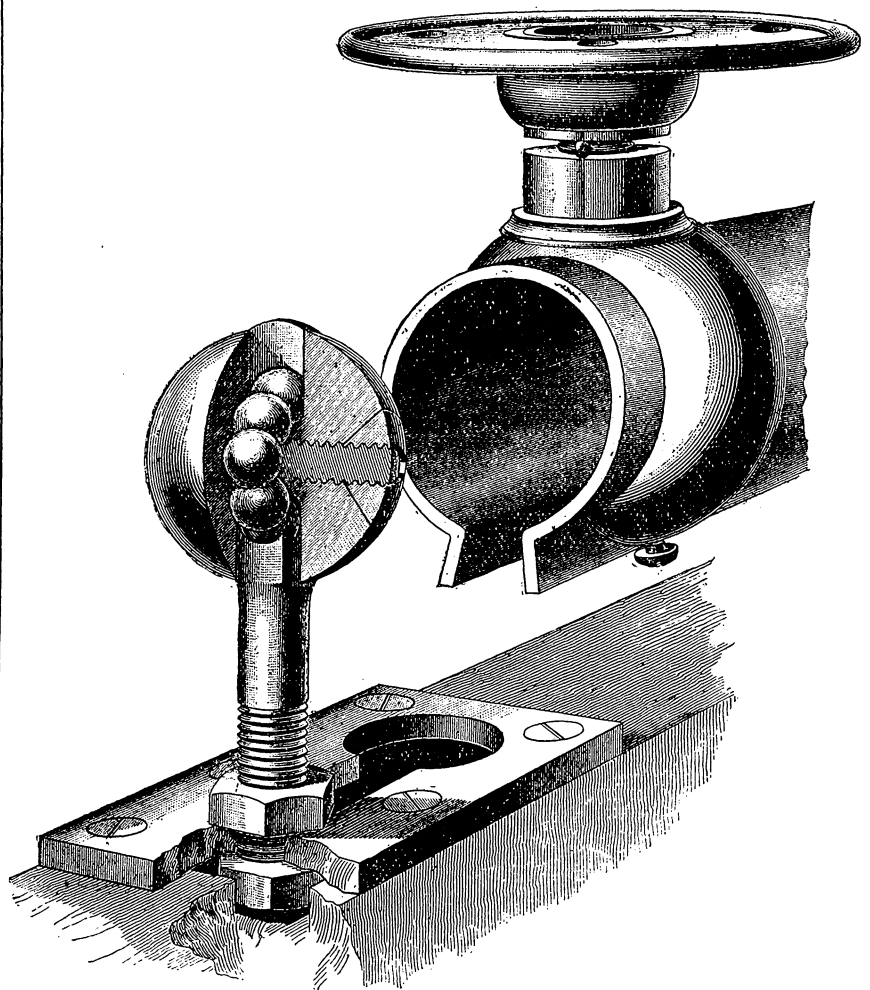


Fig. 1.—The McCabe Ball Bearing Tubular Door Hanger.

lower the track. The hanger or carriage consists of a steel ball  $1\frac{1}{2}$  inches in diameter, hardened in oil for the purpose of reducing friction to a minimum. The ball, Fig. 1, is composed of two hemispherical cones, between which is

a hanging strap and seven universal chilled steel balls, the balls turning on

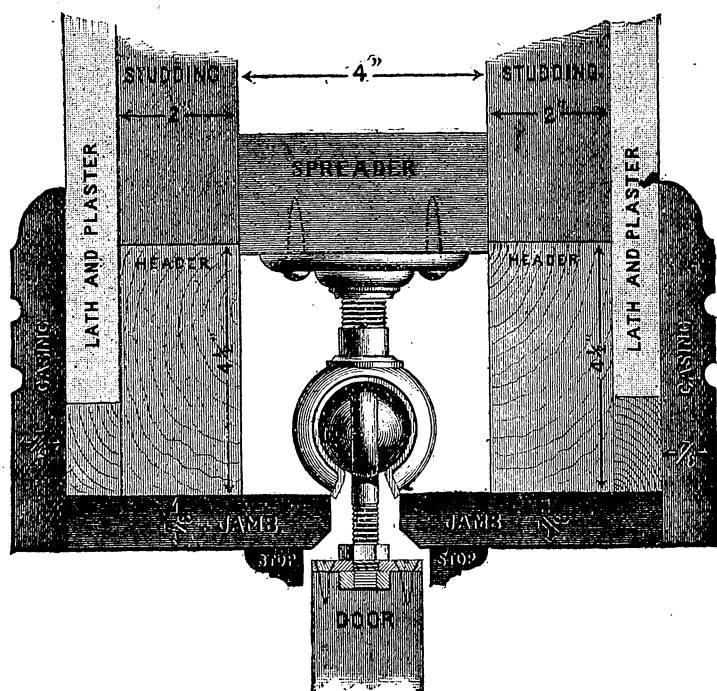


Fig. 2.—Position of the Track Over the Door.

in diameter, hardened in oil for the purpose of reducing friction to a minimum. The cones and in a groove of the hanging strap. The height of the door is adjusted

by the nuts on the hanging strap, one above and the other below the door plate. The appearance of the door after it is

menting. The illustration herewith given shows its form. The outside length is  $17\frac{1}{4}$  inches, and the width and

thus forming a continuous metallic connection which is of course the best conductor of heat, these boxes have a space between the metal edge of the door and frame filled with fireproofing. Referring to the lettering on the cut, A is the metal door frame, B the fire proof back, C the metal door jamb, D the inner fire proof rim, and E the fireproofing around the inner case. The materials used are high grade, cold rolled and pickled steel, and the best non heat-conducting substances. The boxes are of such shape and size that they can be hidden on a shelf, in a trunk, or in a closet or some other convenient place. The company issue a descriptive pamphlet which gives a report of a severe test of the fire proof quality of one of these boxes which was successfully endured.

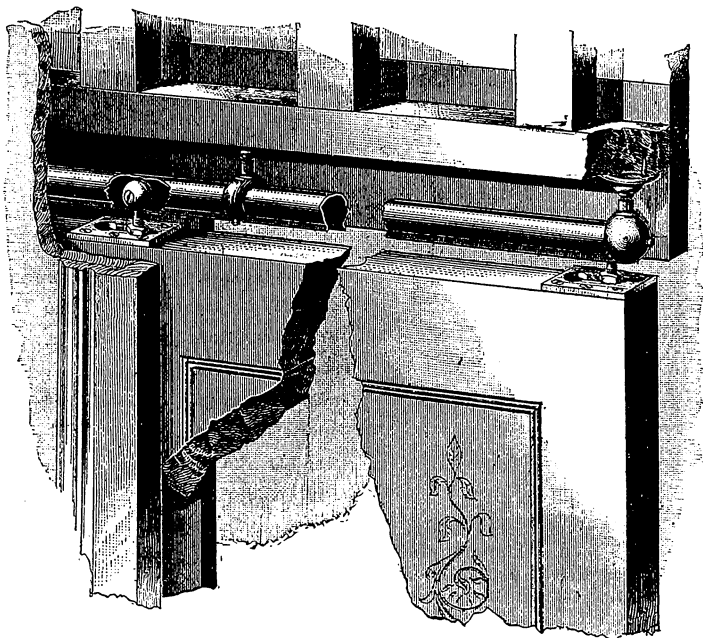


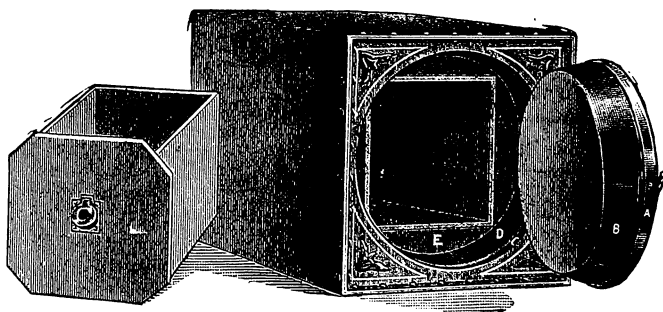
Fig. 3.—Track, Hangers and Door.

hung is shown in Fig. 3. It is explained that the hanging strap centers or divides the load and discharges an equal portion of the load on either side of the slot. The point is made that the track is so constructed that it is impossible for it to clog, there being no place wherein dust or other matter can lodge, and that the hanger is small and strong. Track and hangers are constructed on the same principle for use in barn and elevator doors.

height are each 11 inches. Its inside length is  $10\frac{3}{4}$  inches, width  $5\frac{1}{2}$  inches and height 6 inches. The weight is 55

#### Steel Fire Proof Security Boxes.

The Sidway Mfg. Company, 32 to 40 South Jefferson street, Chicago, are manufacturing a steel fire proof security box which is specially adapted for use in private residences. Safes or other receptacles for protecting valuables, documents, jewelry, &c., from fire are seldom found in residences on account of their cost, size and weight. It is



Steel Fire Proof Security Boxes.

pounds. In the construction of these boxes a different principle is pursued from that followed in making the stand-

connection with marble slabs, sinks, closet tanks, &c. The two smaller sizes of both iron and brass are packed

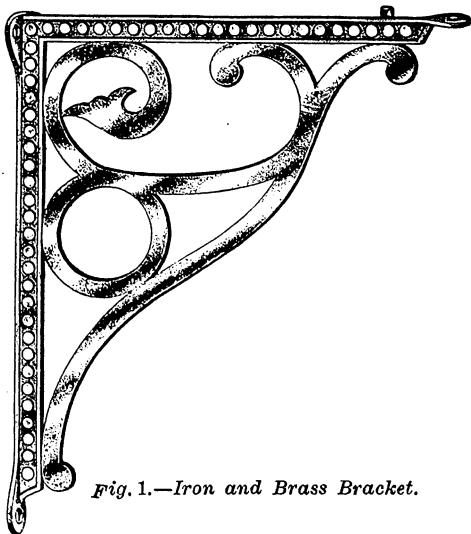


Fig. 1.—Iron and Brass Bracket.

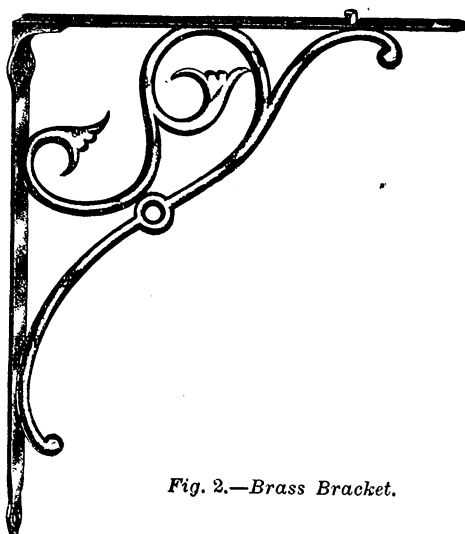


Fig. 2.—Brass Bracket.

claimed that these objections have been overcome in the construction of the Sidway box, after over a year's experi-

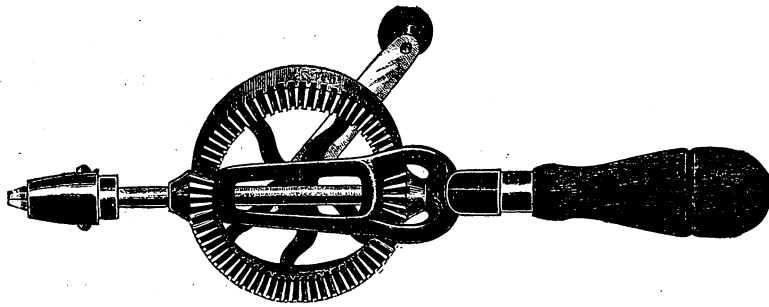
and safes. Instead of having the door composed entirely of metal and closing against the metal edges of the frame,

half a-dozen in a paper box, while the 16 x 18 inch sizes are put up one dozen in a wooden case.

Hand Drill No. 5.

Millers Falls Company, 93 Reade street, New York, are putting on the market the hand drill here shown. The drill is offered as a substitute for drills Nos. 1 B, 3 and 3 B, and has, it is claimed, all of the advantages of the

and to be kept tight in case of shrinkage. A shoulder is provided at the bottom of the handles to receive the full thrust instead of allowing it to come on the bolts. The hinge bolt is of steel and is provided with a jam nut to prevent it coming loose, also to take up all wear perfectly. The length of the steel blade is 9 inches; the length of the en-

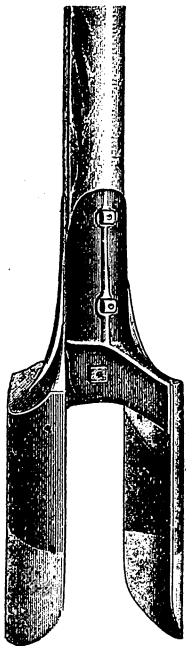


Hand Drill No. 5.

other numbers mentioned, and in addition has a wide rimmed gear to be grasped between the thumb and fingers when the drill is used for delicate work. It is stated that in this manner it can be run without liability of breaking points. The drill is double geared, 11 $\frac{1}{2}$  inches in length, weighing 20 ounces, and is accompanied by six points of the same style as are put up with their automatic borers. The drill has the advantage over No. 3 B of being listed at a less price. The manufacturers state that they shall discontinue the making of the three numbers referred to, and that when their present stock on hand is exhausted the No. 5 drill will be substituted without notice.

The Canton Post Hole Digger.

Gibbs Mfg. Company, Canton, Ohio, are putting on the market a post hole digger as here shown. The handles



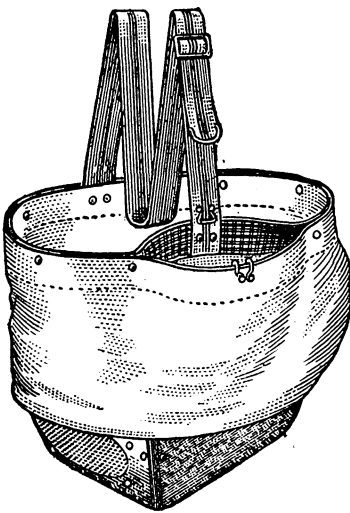
The Canton Post Hole Digger.

open past each other, bringing the strain on the thick way or edge of the handle, instead of apart and on the broad or thin way, thus giving, it is explained, increased strength to the handles. The shanks above the blades are round in form to fit the handles and permits them to be firmly fastened with  $\frac{1}{8}$ -inch bolts,

tire digger is 5 feet 3 inches and the weight 9 pounds each. The manufacturers remark that all the materials used in the construction of the tool are of good size and of strength to withstand the required work, and that although the digger was designed to meet the prevailing tone of low prices the finish will be kept up to their usual good standard.

Bean's Perfection Feed Bag.

John P. Lovell Arms Company, 147 Washington street, Boston, are introducing a feed bag shown herewith. The bag is made of canvas and galvanized iron. There are two bags, one inside



Bean's Perfection Feed Bag.

of the other, with a space between them for 8 quarts of oats, which drop through into the galvanized iron basin, gradually filling it about 1 inch, directly under the horse's mouth. The basin is oblong in shape and has an opening covered with wire screen, with which, it is stated, the oats never come in contact. It is explained that while the animal is eating its nose is at the screen through which it breathes as freely as though it had no bag on. The point is made that 4 quarts of oats slowly fed where the animal gets them all is of more value than 6 quarts gormandized and wasted on the street. The weight of the bag is 2 $\frac{1}{2}$  pounds. The makers claim that the bag prevents waste, gormandizing,

slobbering and breathing in the oats; that it cures the habit of throwing the head, and that it never gets foul.

CONTENTS.

	PAGE
Coking with Recovery of By-Products. Illustrated.....	381
Forging by Hydraulic Pressure. Illus...	388
A Large Electric Contract in Chicago....	390
The Fairbanks Compound Suspension Scale. Illustrated.....	390
Ogden & Wallace's New Warehouse... .	390
The McMyler Machine for Coaling Lake Steamers. Illustrated.....	392
The Week.....	394
Trade Publications.....	394
Editorials:	
The Pig Iron Situation at Chicago....	395
Shortage in Cheap Scrap.....	395
Calcinced Lime in the Blast Furnace....	396
An Independent Crop Investigation...	396
Correspondence.....	398
Personal... .	397
Washington News.....	397
The Bridge for the Hudson River... .	397
Manufacturing:	
Iron and Steel... .	398
Machinery.....	398
Hardware.....	399
Miscellaneous .....	399
The Iron and Metal Trades:	
Philadelphia.....	400
Chicago.....	400
Pittsburgh.....	401
Birmingham.....	402
St. Louis.....	402
Cincinnati.....	403
Louisville.....	403
Financial.....	403
Metal Market.....	404
New York.....	404
British Metal Market.....	405
The Tin Plate Manufacturers.....	405
The Tin Plate Tariff.....	405
Hardware:	
Condition of Trade.....	408
Notes on Prices.....	408
Hardware Club... .	409
The New Tariff on Cutlery.....	409
Outside Business.....	410
Trade Items.....	410
Cooking by Electricity.....	410
Hardware Curios. Illustrated.....	411
Letters from the Trade.....	412
A Home Made Bicycle.....	412
Price-Lists, Circulars, &c.....	412
It Is Reported.....	412
Starrett's Inside Micrometer. Illus....	413
Herrick's Auger and Auger Bit Case. Illustrated.....	413
Starrett's Hermaphrodite Calipers. Illustrated.....	414
The McCabe Ball Bearing Tubular Door Hauger. Illustrated.....	414
Steel Fire Proof Security Boxes. Illus.	415
Bracket for Plumbers. Illustrated....	415
Hand Drill No. 5. Illustrated .....	416
The Canton Post Hole Digger. Illus..	416
Bean's Perfection Feed Bag. Illus....	416
Current Hardware Prices .....	417
Current Metal Prices.....	424



# Current Hardware Prices.

SEPTEMBER 5, 1894.

NOTE.—The quotations given below represent Current Hardware Prices, whether made by manufacturers or jobbers. They apply to such quantities of goods as are usually purchased by retail Hardware merchants. Very small orders and broken packages often command higher prices.

The character @ is used to indicate a range of price: thus discount 50 & 10% @ 50 & 10 & 5%, signifies that the goods in question are sold at prices ranging from 50 & 10% to 50 & 10 & 5%.

## Adjusters, Blind—

Domestic..... \$ dos \$3.00, 33% @ 33% & 10%  
Excelsior..... \$ dos \$10.00..... 50 & 10 & 5%  
North's..... List net @ 10%  
Zimmerman's—See Fasteners Blind.

## Ammunition—See Caps, Cartridges, Shells, &c.

## Anvils—

### American—

Eagle Anvils, \$ 96..... 15 @ 15 & 5%  
Horse shoe brand, Wrought..... 11 @ 11 & 4%  
Moore & Barnes Mfg. Co..... 33 & 2%

### Imported—

Armstrong Mouse Hole..... 94 @ 10 & 4%  
S. & H. machine finished..... 10 @ 11 & 1%  
Trenton..... 94 @ 10 & 4%  
Wilkinson's..... 10 @ 10 & 4%  
Peter Wright's..... 10 @ 11 & 1%

### Anvil Vise and Drill—

Allen Anvil and Vise \$3.00..... 40 & 10%  
Cheney Anvil and Vise..... 25%  
Millers Falls Co., \$15.00..... 20%  
Holt's..... 40 @ 40 & 10%

### Apple Parers—See Parers

### Apple, &c.

### Augers and Bits—

Boring Machine Augers..... 70 @ 70 & 10%  
Car Bits, 12-in. twist..... 50%  
Common Augers and Bits..... 70 @ 70 & 10%  
Cincinnati Bell-Hangers' Bits..... 80 & 10%  
Forstner Pat. Auger Bits..... 15%  
Jennings' Pattern Auger Bits..... 40%  
Jennings' Pattern Auger Bits..... 60%  
J. E. Jennings & Co., No. 10, extension lip..... 40%  
C. E. Jennings & Co., No. 30..... 60%  
C. E. Jennings & Co., Auger Bits, \$ set 32% quaters, No. 5, \$5; No. 8, \$3.50, 25%  
Russell Jennings' Augers and Bits..... 40%  
L'Hommedieu Patent Single twist..... 45%  
L'Hommedieu Car Bits..... 15 & 10%  
Pugh's Black..... 20%  
Pugh's Jennings Pattern..... 30%  
Snell's Bits..... 60 & 5 @ 60 & 10%

### Bit Stock Drills—

Cleveland..... 50 & 10 & 5%  
Cincinnati, for wood..... 30 & 10%  
Cincinnati, for metal..... 45 & 10%  
Morse Twist Drills..... 50 & 10 & 5%  
New Process Twist Drill Co..... 50 & 10 & 5%  
Standard..... 50 & 10 & 5%  
Syracuse, for metal..... 50 & 10%  
Syracuse, for wood (wood list)..... 50 & 30 & 5%

### Expansive Bits—

Clark's small, \$18; large, \$26..... 40 @ 40 & 5%  
Ives' No. 4, \$ dos \$60..... 40 @ 40 & 10%  
Steer's No. 1, \$20; No. 2, \$18..... 40 @ 40 & 5%  
Stearns' No. 2, \$48..... 20%  
Swan's..... 40 @ 40 & 10%

### Gimlet Bits—

See..... 25 @ 25 & 10%  
Common..... \$ gross \$2.50 @ \$3.00  
Diamond..... \$ dos \$1.25..... 40 & 10%  
Double Cut..... 40 & 10%  
Hartwell's..... \$ gross \$1.00, 40 & 10%  
Douglass's..... 40 & 10%  
Ives..... 60 & 10 @ 60 & 10 & 5%  
Shepardson's..... 45 & 10 @ 45 & 10 & 5%

### Hollow Augers—

Bonney's Adjustable, \$ dos \$48..... 50%  
Cincinnati Adjustable..... 25 & 10%  
Cincinnati Standard..... 25 & 10%  
Douglass's..... 33% @ 33% & 10%  
French, Swift & Co. (Beecher)..... 33% @ 33% & 10%  
Ives' Expansive, each \$4.50..... 33% @ 33% & 10%  
Ives' Expansive, each \$4.50..... 20 & 10%  
Stearns' Universal Expansive, each \$4.50..... 20%  
Wood's, \$ dos, \$48..... 25 & 10%

### Ship Augers and Bits—

L'Hommedieu's..... 15 & 10 @ 15 & 10 & 5%  
Snell's..... 25 @ 25 & 10%  
Snell's Ship Auger Pattern Car Bits..... 15 & 10 @ 15 & 10 & 5%  
Watrous's..... 25 @ 25 & 10%

### Awl Hafts—See Hafts, Awl.

### Awls—

Brad, Handled..... \$ gr. \$2.50 @ \$3.00  
Brad, Shoulders..... \$ gr. \$1.30 @ \$1.40  
Pag, Pat..... \$ gr. \$5 @ \$5.50  
Pag, Should..... \$ gr. \$1.50 @ \$1.65  
Scratch, Handled..... \$ gr. \$4.00 @ \$4.50  
Scratch, Socket..... \$ dos. \$1.00 @ \$1.20

### Awl and Tool Sets—See Sets, Awl and Tool.

### Axes—

First quality, best brands..... \$8.00 @ \$8.50  
First quality, other brands..... 5.50 @ 6.00  
Beveled add 60¢ \$ dos.

### Axle Grease—See Grease, Axle.

### Axles—

No. 1 Common..... 3 @ 3 & 4%  
No. 2 Common..... 4 @ 4 & 5%  
Nos. 7 to 14..... 7 @ 7%  
Nos. 15 to 28..... 47%  
Nos. 19 to 22..... 7 @ 7%  
Concord Axles, loose collar..... 4 @ 4 & 5%  
Concord Axles, solid collar..... 5 @ 5 & 6%  
Tubular Axles..... 50%

## Bag Holders—See Holders, Bag.

## Balances—

Sash—  
Caldwell, low list..... 30%  
Pullman..... 60%

## Spring—

Spring Balances..... 40 & 10 @ 50%  
No. 2000 20 80  
Chattillon, \$ dos..... \$0.80 0.95 1.75 net  
Chattillon Straight Balances..... 40 @ 40 & 10%  
Chattillon Circular Balances..... 50 & 10%

## Barb Wire—See Wire, Barb.

## Bars—

## Crow—

Cast Steel..... \$ 2 @ 2 & 4%  
Iron, Steel Points..... \$ 2 @ 2 & 4%

## Basins, Wash—

Standard Fiberglass, No. 1, 10% in., \$1.80;  
12-inch, \$2.00; 13% inch, \$2.50; 15-inch, \$3.00.

## Beams Scale—

Scale Beams, List Jan. 12, '83..... 50 & 10 @ 50 & 10 & 5%

Chattillon's No. 1..... 40%  
Chattillon's No. 2..... 50 & 10 @ 50 & 10 & 5%  
Ousters..... 33 & 2%

## Beaters—Egg—

Bryant's..... \$ gross \$14.00  
Double (H. & R. Mfg. Co.), \$ gro., No. 0 \$12.00; No. 1, \$15.00; No. 2..... \$36.00  
Dover..... \$ dos \$1.00 @ \$1.20  
Dover (Standard Co.)..... \$ dos \$1.00  
Duplex (Standard Co.)..... \$ dos \$1.00  
Duplex Extra Heavy (Standard Co.)..... \$ dos \$2.50  
Easy (H. & R. Mfg. Co.)..... \$ gro \$12.00  
Improved Acme (H. & R. Mfg. Co.)..... \$ gro \$9.00  
Silver & Co..... \$ dos \$5.50  
Spiral..... \$ gro \$4.25 @ \$4.50  
Triple (H. & R. Mfg. Co.)..... \$ gro \$16.50

## Culinary—

Keystone, P. D. & Co., Esch, No. 1, \$1; No. 2, \$2..... 20%

## Bells—

## Cow—

Common Wrought..... 60 & 10%  
Kentucky Durham..... 70 & 10%  
Kentucky, Sargent's list..... 70 & 10%  
Kentucky, "Star"..... 20 & 10%  
Texas Star..... 50 & 10 @ 50 & 10 & 5%  
Western, Sargent's list..... 70 & 10%

## Door—

Crank, Brooks'..... 50 & 10 & 5%  
Crank, Cone's..... 10%  
Crank, Connel's..... 20 & 10%  
Gong, Abbe's..... 33% & 10%  
Gong, Barton's..... 40 & 10 @ 60%  
Gong, Yankee..... 45 & 10%  
Lever, R. & E. Mfg. Co.'s..... 60 & 10 & 5%  
Lever, Sargent's..... 60 & 10%  
Lever, Taylor's Bronzed or Plated..... net  
Lever, Taylor's Japaned..... 25 & 10%  
Pull, Brook's..... 50 & 10 & 5%

## Electric—

Elgelow & Dowse..... 20 @ 20 & 10%  
Wollensak's..... 20 @ 20 & 10%

## Hand—

Extra Heavy Brass..... 70%  
Light Brass..... 70 & 10 @ 70 & 10 & 5%  
Silver Chime..... 33% & 10%  
White..... 33% & 10%  
Globe Cone's Patent..... 25 & 10 @ 35%

## Miscellaneous—

Call..... 45 @ 50%  
Farm Bells..... \$ 2 @ 2%  
Steel Alloy Church and School Bells..... 50%

## Bellows—

Blacksmith's..... 60 & 10 @ 70%  
Hand Bellows..... 40 & 10 @ 50%  
Molders'..... 40 & 10 @ 50%

## Belting, Rubber—

Common Standard..... 75 & 10 @ 75 & 10 & 5%  
Extra..... 60 & 10 @ 70%  
Standard..... 70 & 10 @ 75%  
N.Y.B. & P. Co., Carbon..... 60 & 10 & 5%  
N.Y.B. & P. Co., Double Diamond..... 60%  
N.Y.B. & P. Co., 1846 Para..... 40 & 10%

## Bench Stops—See Stops, Bench

## Benders and Upsetters, Tire—

Detroit Perfect Tire Bender 15 @ 15 & 10%  
Green River Tire Benders and Upsetters..... 20%  
Stoddard's Lightning Tire Upsetters..... 15%

## Bits—

Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

## Bit Holders—See Holders.

## Blind Adjusters—See Adjusters, Blind.

## Blind Fasteners—See Fasteners, Blind.

## Blind Staples—See Staples, Blind.

## Blocks—

Cleveland Block Co., Mal. Iron..... 60 & 10 @ 60 & 10%  
Moore's Novelty, Mal. Iron..... 50 @ 50 & 5%  
Swiss Grip Steel Tackles Blocks 25 @ 25 & 10%

See also Machines Hoisting.

## Bolts—

### Carriage, Machine, &c.—

Com. list June 10, '84..... 80 & 10 @ 80 & 10 & 5%  
Charter Oak, list Oct., 1884..... 80%  
Genuine Eagle, Norway, list Oct. '84..... 80 & 5 @ 80 & 10%  
Eagle, Norway, list Oct. '84..... 80 & 10 @ 80 & 10%  
Phila. pattern, list Oct. 7, '84..... 80%  
R. B. & W., old list..... 70%  
Bolt Ends, list Jan. 1, 1890..... 80 & 10 @ 80 & 20%  
Machine, list Jan. 1, 1890..... 80 & 10 @ 80 & 20%

### Door and Shutter—

Cast Iron Barrel Square, &c..... 75 & 10 @ 75 & 10 & 5%  
Cast Iron Chain (Sargent's list)..... 65 & 10 @ 65 & 10 & 5%  
Cast Iron Shutter Bolts..... 75 & 10 @ 75 & 10 & 5%  
Ives' Patent Door Bolts..... 80 & 10 @ 80 & 10 & 10%  
Wrought Barrel..... 75 & 10 @ 80%  
W. T. B. K. Push Common..... 60 & 10 @ 60 & 10 & 10%  
W. T. Shutter, Brass Knob..... 50 & 10 @ 60%  
W. T. Shutter, Sargent's list..... 60% @ 70%  
W. T. Shutter, all iron, Stanley's..... 60% @ 70%  
Wrought Square..... 75 & 10 @ 80%  
W. T. Sunk Flush, Sargent's list..... 80 & 10%  
W. T. Sunk Flush, Stanley's list..... 60 & 10%

### Stove and Plow—

Flow..... 60 & 10 @ 60 & 10 & 10%  
Stove..... 65 @ 70%  
R. B. & W., Plow..... 55%

### Tire—

Common, list Feb. 28, '83..... 70 @ 70 & 10%  
American Screw Company.....  
Norway, Phila., list Oct. 16, '84..... 80%  
Eagle, Phila., list Oct. 16, '84..... 85%  
Bay State, list Feb. 28, '83..... 75%  
Franklin Moore Co.....  
Norway, Phila., list Oct. 16, '84..... 80%  
Eagle, Phila., list Oct. 16, '84..... 85%  
Kelpise, list Feb. 28, '83..... 75%  
Port Chester Bolt and Nut Company.....  
Empire list Feb. 28, '83..... 75%  
Keystone, Philadel., list Oct. '84..... 80%  
Norway, Phila., list Oct. '84..... 8%  
R. B. & W., Philadel., list Oct. 16, '84..... 85%

### Borers, Tap—

Common and Ring..... 20 & 10%  
Clark's..... 33% @ 35%  
Enterprise Mfg. Co..... 25%  
Ives' Tap Borers..... 33% @ 35%

### Boring Machines—See Machines, Boring.

### Bow Pins—See Pins, Bow.

### Boxes, Letter—

Tatum's..... 40

### Boxes, Wagon—

Per d..... 24%

### Boxes, Miter.

Spilker's Excelsior, 3 in. \$7.50, 4 in. \$8.50, 5 in. \$13.00, 6 in. \$16.00..... 20%

### Braces—

NOTE.—Most Braces are sold at net prices.

Barber's..... 50 & 10%  
Bartholomew's.....  
Armstrong's..... 50 & 5%  
Common Rail, American..... \$1.00 @ \$1.10  
Davis Patent..... 50 & 10%  
Fray's Genuine Spofford's..... 50 & 10 & 5%  
Fray's Nos. 70 to 120, 81 to 123, 207 to 414..... 50 & 10 & 5%  
Ives' New Haven Novelty..... 70 @ 70 & 5%  
New Haven Ratchet..... 80 & 5 @ 80 & 10%  
Barber Ratchet..... 60 & 5 @ 60 & 10%  
Barber's..... 60 & 5 @ 60 & 10%  
Spofford..... 60 & 5 @ 60 & 10%  
P. S. & W. Co., Pack's Patent..... 60%  
Rose & Johnson..... 50%

### Brackets—

Shelf, fancy, Sargent's list..... 70 @ 70 & 10%  
Other makes at a wide range of prices.  
Shelf, plain..... 65 @ 70%  
Regular, list..... 65 @ 70%  
Sargent's list..... 60 & 10 @ 70 & 10%  
Bradley Shelf Brackets..... 70 & 10%

### Bright Wire Goods—See Wire.

### Brollers—

Hens' Self-Inch..... 9 10 9x11  
Basting, \$ Per doz..... \$4.50 5.50 6.50  
Morgan Odorless..... \$ doz \$12, 50%  
New Haven..... 50%  
Broom City..... 65 & 10%  
Wire Goods Co..... 65 & 10%

### Buckets, Well and Fire—

### See Pails.

### Bull Rings—See Rings, Bull.

### Butcher's Cleavers—See Cleavers, Butchers.

### Butts—

### Brass—

Cast Brass, Fast..... 33% @ 10%  
Cast Brass, Loose Joint..... 33% @ 10%  
Cast Brass, Tiebout's..... 50%  
Wrought Brass..... 80 & 10 @ 80 & 20%

### Cast Iron—

Fast Joint, Broad..... 60 & 10 @ 60 & 10 & 10%  
Fast Joint Narrow..... 60 @ 60 & 10%

## Loose Joint.....

Loose Joint, Japaned.....  
Loose Joint, Jap. with Acorns..... 75 & 10  
Loose Pin, Acorns..... 80%  
Loose Pin, Acorns, Japaned.....  
Loose Pin, Acorns, Japaned,  
Plated Tips.....  
Mayer's Hinges.....  
Parliament Butts.....

## Wrought Steel—

Fast Joint, Broad.....  
Fast Joint, Narrow.....  
Fast Joint, Lt. Narrow.....  
Inside Blind, Light.....  
Inside Blind, Regular.....  
Loose Joint, Broad.....  
Loose Pin.....  
Table Butts, Back Flaps, &c.....  
Bronzed Wrought Butts..... 50 & 10 @ 50 & 10 & 5%

## Cages, Bird—

Hendryx Brass:  
3000, 5000, 1100 series..... 10%  
1200 series..... 40%  
200, 300, 600 and 900 series..... 40 & 10 @ 50%  
Hendryx Bronze:  
700, 800 series..... 40 & 10 @ 50%  
Hendryx Enameled..... 40 & 10 @ 50%

## Callipers—See Compasses.

## Calks Toe

Burke's, One Prong, Blunt..... 40 @ 40 & 5%  
Burke's, One Prong, Sharp..... 50 @ 50 & 5%  
Burke's, Two Prong, Blunt..... 50 @ 50 & 5%  
Burke's, Two Prong, Sharp..... 50 @ 50 & 5%  
Gautier, One Prong, Blunt..... 50 @ 50 & 5%

## Can Openers—See Openers, Can.

## Cans Milk—

S. & Co., 5-gal., \$3.00; 8-gal., \$4.40;  
10-gal., \$4.75 each..... 40 & 10

## Cans Oil—

Galvanized Blue Band, 1 gal., \$ dos \$2.55  
Galvanized Blue Band, 5 gal., Tip-Top..... \$ dos \$12.00  
Galvanized Blue Band, 5 gal..... \$ dos \$12.00

## Glass Oil, Friend.....

\$ dos, \$3.75

## Caps—Percussion—

Hicks & Goldmark's and Union Metallic Cartridge Co..... \$ 1000  
Eley's E. B..... 50 @ 50 & 5%  
Eley's D Waterproof, Central Fire..... \$1.50  
E. B. Grd. Edge Cent. Fire, 1-10's..... 47 & 50%  
E. B. Trimmed Edge, 1-10's..... 47 & 50%  
F. L. Waterproof, 1-10's..... 35 @ 37%  
G. D..... 27 @ 30%  
Musket, Waterproof, 1-10's..... 50 @ 50 & 5%  
S. B. Genuine Imported..... 45%

## Primers—

Berdan Primers, \$1.00..... 33%  
B. L. Caps (Sargent's Shells) \$1.00..... 33%  
All other Primers, \$1.20..... 33%

## Cards—

Watson's Cotton, Wool, Horse and File, list January 23, 1891.....

## Carpet Stretchers—

See Stretchers, Carpet.

## Cartridges—

B. B. Caps, Con. Ball, Swgd., \$1.85 @ \$1.90  
B. B. Caps, Round Ball..... \$1.80 @ \$1.85  
Blank Cartridges, except 22 and 32 cal., additional 10% to above discounts.  
Blank Cartridges, 22 cal., \$1.75..... 25%  
Blank Cartridges, 32 cal., \$5.50..... 25%  
Cent. Fire, Military and Sporting 15 & 5 @ 35%  
Cent. Fire, Pistol and Rifle..... 25 & 5 @ 35%  
Rimmed Shells and Bullets..... 15 & 5 @ 35%  
Rim Fire Cartridges..... 50 & 5 @ 35%  
Rim Fire Military..... 15 & 5 @ 35%

## Carpet

**Chalk Lines—See Lines.**

**Checks, Door—**  
Bardsley's.....20%  
Unity.....50%  
**Chisels—**  
**Socket Framing and Firmer**  
Mfr.....  
Ohio Tool Co.....75%100%80%  
P. S. & W.....  
Wetherby.....  
Buck Bros.....30%  
Charles Buck.....30%  
Douglass.....75%75%10%  
Merrill.....60%100%80%10%  
L. & J. White.....80%50%5%  
**Tanged and Miscellaneous**  
Buck Bros.....80%  
Charles Buck.....30%  
Butchers.....\$4.75 to \$5.00 to 2  
Spear & Jacksons.....\$5 to 2  
Tanged Firmer.....50%50%10%  
L. & J. White, Tanged.....25%5%  
Cold Chisels, fair quality, # 14 to 16

**Chucks—**  
Beach Pat.....each, \$3.00.....20%  
Danbury.....each, \$3.00, \$3.00, \$3.00, \$3.00  
Graham Patent.....30%  
More's Adjustable, each, \$7.00, 20% to 25%  
Syracuse, Bals Pat.....25%  
**Kninner Patent Chucks**  
Combination Lathe Chucks.....40%  
Drill Chucks.....25%  
Independent Lathe Chucks.....40%  
Planer Chucks.....20%  
Universal Lathe Chucks.....40%  
Union Mfg. Co.....  
Combination.....40%  
Independent.....40%  
Universal.....40%  
Victor.....\$5.50, 25%  
**Churns—**  
McDermald Star Barrel Churn, each  
6 gal., \$2.60; 10 gal., \$2.75; 15 gal.,  
\$3.00; 20 gal., \$3.25.  
Tiffin Union, each, 5 gal., \$3.25; 7 gal.,  
\$3.75; 10 gal., \$4.25.  
**Clamps—**  
Adjustable, Cincinnati.....15%10%  
Adjustable, Hammers.....15%15%5%  
Adjustable, Stearns.....30%30%10%  
Barnes' Machine's Clamps.....35%  
Cabinet, Sargent's.....25%10%  
Carpenter's, Cincinnati.....70%10%  
Carriage Makers, P. S. & W. Co., 40%10%  
Carriage Makers, Sargent's.....75%75%5%  
Eberhard Mfg. Co.....40%50%40%10%  
Joiners' Clamps, Tatum's.....25%10%  
R. I. Tool Co.'s Wrought Iron.....25%  
Saw Clamps, see Vise, Saw Filers  
Stearns' Malleable, with Wrought Iron  
Screw.....75%75%5%  
Stearns' Steel.....25%  
Warner's.....40%10%40%10%5%  
**Cleavers, Butchers—**  
Beatty's.....40%50%40%10%  
Bradley's.....25%30%  
Foster Bros.....40%10%  
New Haven Edge Tool Co.....40%  
Nichols Bros.....30%  
P. S. & W.....30%35%35%30%10%  
Schulte, Lohoff & Co.....40%40%5%  
L. & J. White.....25%  
**Clips—**  
Baker Axle Clips.....25%25%5%  
Norway Axle Clips.....40%10%  
Norway Spring Bar Clips.....65%5%5%  
8d grade Norway Axle.....70%  
Steel Felloe Clips.....# 1, 4, 6  
Superior Axle Clips.....70%  
Wrought Iron Felloe Clips.....# 1, 4, 6  
**Cloth and Netting, Wire**  
—See Wire, etc.  
**Cockeyes—**  
**Cocks Brass**  
Hardware List, Globe, Kerosene, Lever  
Bibbs, Racking, etc.....60%20%60%10%  
**Coffee Mills—See Mills, Coffee.**  
**Collars Dog—**  
Brass, Pope & Stevens' list.....40%  
Chapman Mfg. Company, new list.....40%  
Embossed, Gift, Pope & Stevens' list 30%10%  
Leather, Pope & Stevens' list.....40%  
Medford Fancy Goods Co.....40%10%50%  
**Combs Curry**  
American Curry Comb Co.....30%40%  
Fitch's.....60%10%60%10%10%  
Gibb's Magnetic.....# 2, doz., \$2.00  
Kohler's Humane.....# 2, doz., \$1.75  
Kohler's Magic Oscillating.....# 2, doz., \$2.00  
Rubber, per doz., \$1.00.....25%  
**Compasses, Dividers &c.**  
Compasses, Callipers, Dividers, 70%10%75%  
Bemis & Call Co.....  
Dividers.....65%  
Callipers, Call's Patent Inside.....55%  
Callipers, Double.....65%  
Callipers, Inside or Outside.....65%  
Callipers, Wing.....80%  
Compasses.....60%5%  
Excellior.....60%  
Starrett's  
Combination Dividers.....25%  
Lock Callipers and Dividers.....25%  
Spring Callipers and Dividers.....25%10%  
Stevens & Co.'s.....25%10%  
**Coolers, Water—**  
S. B. & Co.: 2-gal., \$3.50; 3-gal., \$4.00;  
4-gal., \$4.50; 6-gal., \$5.00 each.....00%  
**Coopers Tools—**  
See Tools, Coopers.  
**Cord—**  
Sash—  
Braided, Crown Drab and Fancy, # 1  
55%.....80%  
Braided, Crown White, # 1, 50%.....50%  
Cable Laid Italian Sash.....# 1, 10%20%  
Common.....# 1, 80%90%  
Common Russia Sash.....# 1, 12%18%  
Egyptian, Iron Hemp, Braided.....# 1, 12%12%  
India Cable Laid Sash.....# 1, 11%12%  
Massachusetts, White.....# 1, 22%24%  
Ossawa Mills—  
Crown, Solid Braided White, # 1, 22%  
Crown, Drab and Fancy.....# 1, 22%  
Braided, Giant, Drab and Fancy, # 1, 30%  
Braided, Giant, White.....# 1, 20%  
Patent good quality.....# 1, 10%12%  
Patent Russia Sash.....# 1, 13%14%  
Barnes—  
Braided, Drab Cotton.....# 1, 42%  
Braided, Italian Hemp.....# 1, 40%  
Braided, Linen.....# 1, 50%  
Braided, White Cotton.....# 1, 87%  
Semper Item, Braided, White.....26%  
Silver Lake  
A quality, Drab, 55%.....25%  
A quality, White, 55%.....25%  
B quality, Drab, 55%.....10%  
B quality, White, 30%.....10%  
Sylvan Spring, Extra Braided, Drab.....39%  
Sylvan Spring, Extra Braided, White.....34%  
Tate's Solid Braided.....# 1, 37%  
Economy Drab.....# 1, 37%

Economy, White.....# 1, 37%  
Hercules, Drab.....# 1, 30%  
Hercules, White.....# 1, 25%  
White Cotton Braided, fair.....# 1, 33%25%  
**Wire Picture—**  
80%100%80%20%  
Braided or Twisted.....80%100%80%20%  
**Corkscrews—See Screws, Cork.**  
**Corn Knives and Cutters**  
See Knives, Corn.  
**Crackers, Nut—**  
Acme.....  
Japaned, # gro., \$30.....50%  
Nickel Plated, # gro., \$30.....10%  
Table (H. & B. Mfg. Co.).....40%  
Turner & Seymour Mfg. Co.....50%  
**Cradles—**  
Grain.....50%25%50%5%2%  
**Crayons—**  
White Crayons, # gross.....60%6%  
Cases, 100 gr., \$3.75 to \$4.25, at factory.  
D. M. Stewart Mfg. Co.....  
Metal Workers' # gross, \$2.50, 20%25%  
Railroad, # gross, 2.00, 20%25%  
Rolling Mill, # gross, 2.50, 20%25%  
Soapstone Pencils, # gross, 1.50, 30%25%  
See also Chalk.  
**Creamery Pails—See Pails, Creamery.**  
**Crow Bars—See Bars, Crow.**  
**Curry Combs—**  
See Combs, Curry.  
**Cutters—**  
**Meat—**  
American.....# 2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340, 350, 360, 370, 380, 390, 400, 410, 420, 430, 440, 450, 460, 470, 480, 490, 500, 510, 520, 530, 540, 550, 560, 570, 580, 590, 600, 610, 620, 630, 640, 650, 660, 670, 680, 690, 700, 710, 720, 730, 740, 750, 760, 770, 780, 790, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960, 970, 980, 990, 1000, 1010, 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090, 1100, 1110, 1120, 1130, 1140, 1150, 1160, 1170, 1180, 1190, 1200, 1210, 1220, 1230, 1240, 1250, 1260, 1270, 1280, 1290, 1300, 1310, 1320, 1330, 1340, 1350, 1360, 1370, 1380, 1390, 1400, 1410, 1420, 1430, 1440, 1450, 1460, 1470, 1480, 1490, 1500, 1510, 1520, 1530, 1540, 1550, 1560, 1570, 1580, 1590, 1600, 1610, 1620, 1630, 1640, 1650, 1660, 1670, 1680, 1690, 1700, 1710, 1720, 1730, 1740, 1750, 1760, 1770, 1780, 1790, 1800, 1810, 1820, 1830, 1840, 1850, 1860, 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940, 1950, 1960, 1970, 1980, 1990, 2000, 2010, 2020, 2030, 2040, 2050, 2060, 2070, 2080, 2090, 2100, 2110, 2120, 2130, 2140, 2150, 2160, 2170, 2180, 2190, 2200, 2210, 2220, 2230, 2240, 2250, 2260, 2270, 2280, 2290, 2300, 2310, 2320, 2330, 2340, 2350, 2360, 2370, 2380, 2390, 2400, 2410, 2420, 2430, 2440, 2450, 2460, 2470, 2480, 2490, 2500, 2510, 2520, 2530, 2540, 2550, 2560, 2570, 2580, 2590, 2600, 2610, 2620, 2630, 2640, 2650, 2660, 2670, 2680, 2690, 2700, 2710, 2720, 2730, 2740, 2750, 2760, 2770, 2780, 2790, 2800, 2810, 2820, 2830, 2840, 2850, 2860, 2870, 2880, 2890, 2900, 2910, 2920, 2930, 2940, 2950, 2960, 2970, 2980, 2990, 3000, 3010, 3020, 3030, 3040, 3050, 3060, 3070, 3080, 3090, 3100, 3110, 3120, 3130, 3140, 3150, 3160, 3170, 3180, 3190, 3200, 3210, 3220, 3230, 3240, 3250, 3260, 3270, 3280, 3290, 3300, 3310, 3320, 3330, 3340, 3350, 3360, 3370, 3380, 3390, 3400, 3410, 3420, 3430, 3440, 3450, 3460, 3470, 3480, 3490, 3500, 3510, 3520, 3530, 3540, 3550, 3560, 3570, 3580, 3590, 3600, 3610, 3620, 3630, 3640, 3650, 3660, 3670, 3680, 3690, 3700, 3710, 3720, 3730, 3740, 3750, 3760, 3770, 3780, 3790, 3800, 3810, 3820, 3830, 3840, 3850, 3860, 3870, 3880, 3890, 3900, 3910, 3920, 3930, 3940, 3950, 3960, 3970, 3980, 3990, 4000, 4010, 4020, 4030, 4040, 4050, 4060, 4070, 4080, 4090, 4100, 4110, 4120, 4130, 4140, 4150, 4160, 4170, 4180, 4190, 4200, 4210, 4220, 4230, 4240, 4250, 4260, 4270, 4280, 4290, 4300, 4310, 4320, 4330, 4340, 4350, 4360, 4370, 4380, 4390, 4400, 4410, 4420, 4430, 4440, 4450, 4460, 4470, 4480, 4490, 4500, 4510, 4520, 4530, 4540, 4550, 4560, 4570, 4580, 4590, 4600, 4610, 4620, 4630, 4640, 4650, 4660, 4670, 4680, 4690, 4700, 4710, 4720, 4730, 4740, 4750, 4760, 4770, 4780, 4790, 4800, 4810, 4820, 4830, 4840, 4850, 4860, 4870, 4880, 4890, 4900, 4910, 4920, 4930, 4940, 4950, 4960, 4970, 4980, 4990, 5000, 5010, 5020, 5030, 5040, 5050, 5060, 5070, 5080, 5090, 5100, 5110, 5120, 5130, 5140, 5150, 5160, 5170, 5180, 5190, 5200, 5210, 5220, 5230, 5240, 5250, 5260, 5270, 5280, 5290, 5300, 5310, 5320, 5330, 5340, 5350, 5360, 5370, 5380, 5390, 5400, 5410, 5420, 5430, 5440, 5450, 5460, 5470, 5480, 5490, 5500, 5510, 5520, 5530, 5540, 5550, 5560, 5570, 5580, 5590, 5600, 5610, 5620, 5630, 5640, 5650, 5660, 5670, 5680, 5690, 5700, 5710, 5720, 5730, 5740, 5750, 5760, 5770, 5780, 5790, 5800, 5810, 5820, 5830, 5840, 5850, 5860, 5870, 5880, 5890, 5900, 5910, 5920, 5930, 5940, 5950, 5960, 5970, 5980, 5990, 6000, 6010, 6020, 6030, 6040, 6050, 6060, 6070, 6080, 6090, 6100, 6110, 6120, 6130, 6140, 6150, 6160, 6170, 6180, 6190, 6200, 6210, 6220, 6230, 6240, 6250, 6260, 6270, 6280, 6290, 6300, 6310, 6320, 6330, 6340, 6350, 6360, 6370, 6380, 6390, 6400, 6410, 6420, 6430, 6440, 6450, 6460, 6470, 6480, 6490, 6500, 6510, 6520, 6530, 6540, 6550, 6560, 6570, 6580, 6590, 6600, 6610, 6620, 6630, 6640, 6650, 6660, 6670, 6680, 6690, 6700, 6710, 6720, 6730, 6740, 6750, 6760, 6770, 6780, 6790, 6800, 6810, 6820, 6830, 6840, 6850, 6860, 6870, 6880, 6890, 6900, 6910, 6920, 6930, 6940, 6950, 6960, 6970, 6980, 6990, 7000, 7010, 7020, 7030, 7040, 7050, 7060, 7070, 7080, 7090, 7100, 7110, 7120, 7130, 7140, 7150, 7160, 7170, 7180, 7190, 7200, 7210, 7220, 7230, 7240, 7250, 7260, 7270, 7280, 7290, 7300, 7310, 7320, 7330, 7340, 7350, 7360, 7370, 7380, 7390, 7400, 7410, 7420, 7430, 7440, 7450, 7460, 7470, 7480, 7490, 7500, 7510, 7520, 7530, 7540, 7550, 7560, 7570, 7580, 7590, 7600, 7610, 7620, 7630, 7640, 7650, 7660, 7670, 7680, 7690, 7700, 7710, 7720, 7730, 7740, 7750, 7760, 7770, 7780, 7790, 7800, 7810, 7820, 7830, 7840, 7850, 7860, 7870, 7880, 7890, 7900, 7910, 7920, 7930, 7940, 7950, 7960, 7970, 7980, 7990, 8000, 8010, 8020, 8030, 8040, 8050, 8060, 8070, 8080, 8090, 8100, 8110, 8120, 8130, 8140, 8150, 8160, 8170, 8180, 8190, 8200, 8210, 8220, 8230, 8240, 8250, 8260, 8270, 8280, 8290, 8300, 8310, 8320, 8330, 8340, 8350, 8360, 8370, 8380, 8390, 8400, 8410, 8420, 8430, 8440, 8450, 8460, 8470, 8480, 8490, 8500, 8510, 8520, 8530, 8540, 8550, 8560, 8570, 8580, 8590, 8600, 8610, 8620, 8630, 8640, 8650, 8660, 8670, 8680, 8690, 8700, 8710, 8720, 8730, 8740, 8750, 8760, 8770, 8780, 8790, 8800, 8810, 8820, 8830, 8840, 8850, 8860, 8870, 8880, 8890, 8900, 8910, 8920, 8930, 8940, 8950, 8960, 8970, 8980, 8990, 9000, 9010, 9020, 9030, 9040, 9050, 9060, 9070, 9080, 9090, 9100, 9110, 9120, 9130, 9140, 9150, 9160, 9170, 9180, 9190, 9200, 9210, 9220, 9230, 9240, 9250, 9260, 9270, 9280, 9290, 9300, 9310, 9320, 9330, 9340, 9350, 9360, 9370, 9380, 9390, 9400, 9410, 9420, 9430, 9440, 9450, 9460, 9470, 9480, 9490, 9500, 9510, 9520, 9530, 9540, 9550, 9560, 9570, 9580, 9590, 9600, 9610, 9620, 9630, 9640, 9650, 9660, 9670, 9680, 9690, 9700, 9710, 9720, 9730, 9740, 9750, 9760, 9770, 9780, 9790, 9800, 9810, 9820, 9830, 9840, 9850, 9860, 9870, 9880, 9890, 9900, 9910, 9920, 9930, 9940, 9950, 9960, 9970, 9980, 9990, 10000, 10010, 10020, 10030, 10040, 10050, 10060, 10070, 10080, 10090, 10100, 10110, 10120, 10130, 10140, 10150, 10160, 10170, 10180, 10190, 10200, 10210, 10220, 10230, 10240, 10250, 10260, 10270, 10280, 10290, 10300, 10310, 10320, 10330, 10340, 10350, 10360, 10370, 10380, 10390, 10400, 10410, 10420, 10430, 10440, 10450, 10460, 10470, 10480, 10490, 10500, 10510, 10520, 10530, 10540, 10550, 10560, 10570, 10580, 10590, 10600, 10610, 10620, 10630, 10640, 10650, 10660, 10670, 10680, 10690, 10700, 10710, 10720, 10730, 10740, 10750, 10760, 10770, 10780, 10790, 10800, 10810, 10820, 10830, 10840, 10850, 10860, 10870, 10880, 10890, 10900, 10910, 10920, 10930, 10940, 10950, 10960, 10970, 10980, 10990, 11000, 11010, 11020, 11030, 11040, 11050, 11060, 11070, 11080, 11090, 11100, 11110, 11120, 11130, 11140, 11150, 11160, 11170, 11180, 11190, 11200, 11210, 11220, 11230, 11240, 11250, 11260, 11270, 11280, 11290, 11300, 11310, 11320, 11330, 11340, 11350, 11360, 11370, 11380, 11390, 11400, 11410, 11420, 11430, 11440, 11450, 11460, 11470, 11480, 11490, 11500, 11510, 11520, 11530, 11540, 11550, 11560, 11570, 11580, 11590, 11600, 11610, 11620, 11630, 11640, 11650, 11660, 11670, 11680, 11690, 11700, 11710, 11720, 11730, 11740, 11750, 11760, 11770, 11780, 11790, 11800, 11810, 11820, 11830, 11840, 11850, 11860, 11870, 11880, 11890, 11900, 11910, 11920, 11930, 11940, 11950, 11960, 11970, 11980, 11990, 12000, 12010, 12020, 12030, 12040, 12050, 12060, 12070, 12080, 12090, 12100, 12110, 12120, 12130, 12140, 12150, 12160, 12170, 12180, 12190, 12200, 12210, 12220, 12230, 12240, 12250, 12260, 12270, 12280, 12290, 12300, 12310, 12320, 12330, 12340, 12350, 12360, 12370, 12380, 12390, 12400, 12410, 12420, 12430, 12440, 12450, 12460, 12470, 12480, 12490, 12500, 12510, 12520, 12530, 12540, 12550, 12560, 12570, 12580, 12590, 12600, 12610, 12620, 12630, 12640, 12650, 12660, 12670, 12680, 12690, 12700, 12710, 12720, 12730, 12740, 12750, 12760, 12770, 12780, 12790, 12800, 12810, 12820, 12830, 12840, 12850, 12860, 12870, 12880, 12890, 12900, 12910, 12920, 12930, 12940, 12950, 12960, 12970, 12980, 12990, 13000, 13010, 13020, 13030, 13040, 13050, 13060, 13070, 13080, 13090, 13100, 13110, 13120, 13130, 13140, 13150, 13160, 13170, 13180, 13190, 13200, 13210, 13220, 13230, 13240, 13250, 13260, 13270, 13280, 13290, 13300, 13310, 13320, 13330, 13340, 13350, 13360, 13370, 13380, 13390, 13400, 13410, 13420, 13430, 13440, 13450, 13460, 13470, 13480, 13490, 13500, 13510, 13520, 13530, 13540, 13550, 13560, 13570, 13580, 13590, 13600, 13610, 13620, 13630, 13640, 13650, 13660, 13670, 13680, 13690, 13700, 13710, 13720, 13730, 13740, 13750, 13760, 13770, 13780, 13790, 13800, 13810, 13820, 13830, 13840, 13850, 13860, 13870, 13880, 13890, 13900, 13910, 13920, 13930, 13940, 13950, 13960, 13970, 13980, 13990, 14000, 14010, 14020, 14030, 14040, 14050, 14060, 14070, 14080, 14090, 14100, 14110, 14120, 14130, 14140, 14150, 14160, 14170, 14180, 14190, 14200, 14210, 14220, 14230, 14240, 14250, 14260, 14270, 14280, 14290, 14300, 14310, 14320, 14330, 14340, 14350, 14360, 14370, 14380, 14390, 14400, 14410, 14420, 14430, 14440, 14450, 14460, 14470, 14480, 14490, 14500, 14510, 14520, 14530, 14540, 14550, 14560, 14570, 14580, 14590, 14600, 14610, 14620, 14630, 14640, 14650, 14660, 14670, 14680, 14690, 14700, 14710, 14720, 14730, 14740, 14750, 14760, 14770, 14780, 14790, 14800, 14810, 14820, 1

**Halters—**

Covert's Adj. Rope Halters.....	40¢25
Covert's Adj. Web Halters.....	85¢25
Covert's Hemp Horse and Cattle Tie.....	50¢10
Covert's Jute Cattle Ties.....	70¢10
Covert's Jute Horse Ties.....	70¢25
Covert's Rope, 7-16 in. Jute.....	70¢25
Covert's Rope, 7-16 in. Hemp.....	50¢25
Covert's Rope, Jute.....	50¢10
Covert's Saddlery Works Halters.....	39¢45
Covert's Saddlery Works Hand Web Halters.....	39¢45
Covert's Saddlery Works Horse and Cattle Ties.....	38¢45

**Hammers—****Handled Hammers—**

Atha Tool Co.....	50¢10
Buffalo Hammer Co.....	50¢10
Humason & Beckley.....	50¢10
Verree.....	40¢10
Cheney's Claw.....	40¢10
Cheney's Machinists' & Riveting.....	50¢25
C. Hammond & Son.....	40¢10
Magnetic Tack, Nos. 1, 2, 3, 4, 5.....	1.50
Maydole's, list Dec. 1, 85.....	25¢10
Peck, Stow & Wilcox.....	40¢10
Fayette R. Plumb.....	40¢10
Artisans' Choice, A. E. Nail.....	40¢12
Engineers' and B. S. Hand.....	80¢15
Machinists' Hammers.....	40¢10
Regular V. & P. A. E. Nail.....	40¢12
Other Hammers.....	40¢12
Sargent's.....	40¢10
Warner & Nobles, new list.....	25¢10

**Heavy Hammers and Sledges—**

3 lb and under.....	40¢
3 to 5 lb.....	80¢
Over 5 lb.....	1.00
Wilkinson's Smiths.....	10¢10

**Handcuffs and Leg Irons—****See Police Goods.****Handles—****Cross-Cut Saw Handles—**

Atkins.....	40¢
Champion.....	15¢
Ely's Perfection.....	50¢
Sensible.....	50¢

**Iron, Wrought or Cast—**

Barn Door, dox \$1.40.....	20¢5
Bronze Iron Door Latch.....	40¢
Chest, Sargent's list.....	50¢10
Door or Thumb.....	1.00
Per doz.....	0.90 1.00 1.08 1.35 1.50

**Jan'd Store Door Handles—**

Plate, \$1.10 plate, \$0.88.....	10¢
Roggin's Latches.....	20¢

**Wood—**

Anger, assorted.....	gr 5.00
Anger, large.....	50¢
File, assorted.....	gr 2.75
Brad Axl.....	gr 2.00
Apple Firmer Chisel, ass'd.....	gr 5.00
Apple Firmer Chisel, large.....	gr 5.00
Hickory Firmer Chisel, ass'd.....	gr 5.00
Hickory Firmer Chisel, large.....	gr 5.00
Socket Firmer Chisel, ass'd.....	gr 5.00
Socket Framing Chisel, ass'd.....	gr 5.00
Chisel, Fibre Head.....	33¢
Hammer, Hatchet, Axe, &c.....	40¢40
Hoe, Rake, Shovel, &c.....	40¢40
Pat. Auger, Douglass.....	set 1.25
Pat. Auger, Ives.....	set 1.00
Pat. Auger, Swan.....	set 1.00
Saw and Plane.....	40¢10
J. B. Smith & Co.'s Pat. File.....	60¢

**Hangers—**

Barn Door, New England.....	70¢70
Barn Door, old patterns.....	70¢70
Barry.....	60¢
Best Anti-Friction.....	60¢10
Boss.....	60¢10
Carrier Steel Anti-Friction.....	60¢10
Champion.....	60¢10
Chicago Anti-Friction.....	60¢10
Climax Anti-Friction.....	60¢10
Cincinnati Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.....	65¢

Crecent.....	60¢80
Cronk's Patent Covered.....	60¢10
Duplex (Wood Track).....	60¢10
Economy.....	60¢10
Hamilton Wrought Steel Track.....	60¢10
Interstate.....	60¢10
Klinder's.....	60¢10
Lane's New Standard.....	60¢10
Lane's Patent.....	60¢10
Lane's Steel Parlor.....	60¢10
Lundy, Steel Parlor.....	60¢10
Magic.....	60¢10
Matchless.....	60¢10
Moody.....	60¢10
Moore's Baggage Car Door.....	60¢10
Moore's Elevator.....	60¢10
Moore's Rail.....	60¢10
Nickel, Steel, Nos. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.....	65¢
Orleans Steel.....	60¢10
Paragon Nos. 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.....	65¢
Pendulum, Payson's.....	60¢10
Perfection.....	60¢10
Richard.....	60¢10
Ramsen Steel Anti-Friction.....	60¢10
Star.....	60¢10
Stearns' Anti-Friction.....	60¢10
Stearns' Challenge.....	60¢10
Sterling.....	60¢10
Terry's Ideal.....	60¢10
Terry's Modern.....	60¢10
Terry's Shield.....	60¢10
Terry's Solid.....	60¢10
Terry's Wrought Single Strap.....	60¢10
Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3, \$18.00.....	60¢10
Warner's Pat.....	60¢10
West.....	60¢10
Zenith for Wood Track.....	65¢

**Harness Snaps—See Snaps.****Hatchets—**

American Axe and Tool Co.....	40¢10
Blood's.....	50¢
Hunt's.....	50¢
Mann's.....	50¢
Underhill's.....	50¢
C. Hammond & Son.....	50¢
Fayette R. Plumb.....	50¢
Collins.....	50¢
Buffalo Hammer Co.....	50¢
Kelly's.....	50¢
P. B. & W. Co.....	50¢
Sargent & Co.....	50¢
O. White, Lohr & Co.....	50¢
Ten Eyck Edge Tool Co.....	50¢

**Hay and Straw Knives****See Knives.****Hinges****Blind Hinges—**

Clark's Nos. 1, 3, 5, 1868, Old Pattern.....	75¢10
Nos. 1 and 3, Tip Pattern.....	75¢10
No. 50 Buffalo Noiseless, 40, 60, 80 and 85.....	75¢10
Buffalo Reversible, Nos. 3, 2, 1, 1/2, 1 and 0.....	75¢10
No. 1 Cottage for wood only.....	80¢10
No. 1 Diamond, for wood only.....	80¢10
Dixie L. & P., Nos. 3, 2, 1, 1/2, 1, 0, 0, 4 and 5.....	75¢10
No. 25 Empire Reversible.....	75¢10
Lull & Porter, Nos. 3, 2, 1, 1/2, 1, 0, 0, 4 and 5.....	75¢10
Mortise Gravity, Nos. 2, 4, 4, 4, 6, 8, 9 and 10.....	50¢
Huffer.....	60¢10
Parker.....	75¢10
North's Automatic Blind Hinges.....	75¢10
Wood, \$9.00; No. 3, for Brick.....	1.10
Reading's Gravity.....	75¢10
Sargent's Nos. 1, 3, 5, 11, 12, 13.....	75¢10
Shepard's.....	75¢10
Acme, Lull & Porter, Nos. 3, 2, 1, 1/2, 1, 0, 0, 4 and 5.....	75¢10
Buffalo Gravity Locking, Nos. 1, 3, 5 and 5.....	80¢10
Champion Gravity Locking, No. 75.....	80¢10
Clark's or Shepard's 1868, Old Pattern, Nos. 1, 3 and 5.....	75¢10
Clark's or Shepard's Tip Pattern, Nos. 1, 3 and 5.....	75¢10
Double Locking, Nos. 20 and 25.....	70¢5
Empire, Nos. 101 and 103.....	75¢5
Niagara Gravity Locking, Nos. 1, 3 and 5.....	80¢5
No. 50, 60, 65 and 55.....	75¢5
O. S. Lull & Porter, Nos. 3, 2, 1, 1/2, 1, 0, 0, 4 and 5.....	75¢10
Pioneer, Nos. 060, 45 and 54.....	75¢5
Steamboat Gravity Locking No. 10.....	80¢10

**Gate Hinges—**

Automatic.....	50¢
Clark's Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.....	50¢
N. E.....	50¢
N. E. Reversible.....	50¢
N. Y. State.....	50¢
Shepard's Nos. 1, 2, 3.....	50¢
Western.....	50¢

**Spring Hinges—**

Acme.....	30¢
American.....	30¢
Barley's Patent Checking.....	15¢
Barker's Double Acting.....	25¢
Bommer's Japanned.....	35¢
Bommer's All other Kinds.....	30¢
Buckman's.....	15¢
Champion.....	30¢
Chicago.....	30¢
Columbia.....	30¢
Crown.....	20¢
Devore, No. L.....	30¢
Freeport.....	30¢
Geer's Spring and Blank Butts.....	30¢
Gem.....	30¢
Ideal No. 3.....	30¢
J. G. C. Covered.....	30¢
Knoxall.....	30¢
New Idea No. 1.....	30¢
New Idea No. 2.....	30¢
New Idea Dbl. Acting.....	30¢
No. 25 Unbreakable.....	30¢
Oxford.....	30¢
Reliable.....	30¢
Rex.....	30¢
Royal.....	30¢
Samson.....	30¢
Stearns' Noiseless Floor.....	30¢
Surprise.....	30¢
Union Mfg. Co.....	30¢
Union Spring Hinge Co.'s list, March, 1886.....	30¢
Wiles, No. 1, \$1.00; No. 2, \$1.10.....	30¢

**Wrought Iron Hinges—**

Cornett's Strap and T. List May 22, 1894.....	60¢10
---	-------

**Plate Hinges, 8, 10 and 12 in., dox \$1.50****"Providence" over 12 in. dox \$1.50****Roller Blind Hinges, Nos. 32 and 34.....****Roller Blind Hinges, Nos. 232 and 234.....****Roller Plate.....****Roller Raised.....****Screw Hook and Eye.....****Screw Hook and (6 to 12 in. dox \$1.50)****Strap.....****Hoes—Eye.....****Scovill and Oval Pattern.....****D. H. Scovill.....****Grub.....****Lane's Crescent, Planter's Pattern.....****Lane's Razor Blade, Scovill Pat.....****Handled.....****Garden, Mortar, &c.....****Magie.....****Planter's, Cotton, &c.....****Warren Hoe.....****Hog Rings and Ringers—****See Rings and Ringers.****Hoisting Apparatus—****See Macines, Hoisting.****Hollow-Ware—****See Ware, Hollow.****Holders—****Bag—****Sensible Bag and Twine.....****Spangle's Pat.....****Bit—****Angular.....****Diagonal.....****Extension.....****Barber's, dox \$15.00.....****Ives, dox \$20.00.....****File and Tool.....****Nicholson File Holder.....****Sash—****Motley's Adj. Sash, Medium Size.....****Books—****Cast Iron—****Bird Cage, Reading.....****Bird Cage, Sargent's List.....****Clothes Line, Sargent's List.....****Colling, Sargent's list.....****Clothes Line, Reading list.....****Clothes Line, Reading list.....****Coat and Hat, Moore's.....****Coat and Hat, Reading.....****Coat and Hat, Sargent's list.....****Hammock, E. C. Stearns & Co., dox.....****Harness, Reading list.....****Wire—****Atlas, Coat and Hat.....****Belt.....****Handy Hat and Coat.....****Indestructible Coat and Hat.....****Steady Ceiling Hooks.....****Williamson's Bird Cage Hooks, list April, 1892.....****Wire Coat and Hat, Gem, list April, 1886.....****Wire Coat and Hat, Miles, list April.....****Wire Coat, Hat, Standard.....****Brizhr Wire Goods—See Wire.****Wrought Iron—****Cotton Pat. (N. Y. Mallet and Handle).....****Wks.....****Tinsel and Picture, T. & S. Mfg. Co.....****Wrought Staples Hooks, &c.....****See Wrought Goods.****Miscellaneous—****Fish Hooks, American.....****Grass, No. 2, \$2.00; No. 3, \$2.10; No. 4, \$2.25.....****Hooks and Eyes—Brass.....****Hooks and Eyes—Malleable Iron.....****Nollin's Grass.....****Whimtree—Patent.....****Bench Hooks—See Bench Stops.****Horse Nails—See Nails, Horse.****Horse Shoes—****See Shoes, Horse.****Hose, Rubber—****Competition, Fair quality.....****Competition, Low Grade, 1/2 in. ft. 5/4.....****Extra.....****Standard.....****N. Y. B. & P. Co., Carbon.....****N. Y. B. & P. Co., Double Diamond.....**



45¢  
Bomer's Night Latches..... 175¢  
R. & E. Mfg. Co., list Mar. 20, 1889..... 100¢  
60¢10@70¢  
Sargent & Co., list July, 1894. 60¢10@70¢  
Warner's Burglar Proof. # doz. \$8.00, 50¢  
Elevator—  
Moore's..... 33¢  
Padlocks—  
Wrought Iron Padlocks:  
Brittan, Graham & Mathes, list  
Jan., 1894..... 75¢  
Mallory, Wheeler Co., list Jan. 1,  
1894..... 75¢  
Norwich Lock Mfg. Co., list June  
10, 1891..... 60¢25¢  
Russell & Erwin Mfg. Co., list June  
10, 1891..... 50¢25¢  
Sargent & Co., list January 1, 1891  
..... 75¢  
William Wilcox Mfg. Co., list Janu-  
ary 1, 1891..... 75¢20¢  
Ames Sword Co. up to No. 108 incln. 50¢  
Ames Sword Co. above No. 103..... 50¢10¢  
Barnes Mfg. Co..... 40¢40¢10¢  
Champion Padlocks..... 40¢  
A. E. Deitz..... 40¢  
Eureka Lock Co..... 40¢25¢  
R. T. Fraim's Keystone Scandinavian  
120 line..... 90¢50¢  
100 line..... 90¢25¢  
109 line..... 65¢  
510 line..... 70¢10¢  
#25, 610 and 200 lines..... 70¢  
All other numbers..... 50¢25¢  
Horseshoes..... # doz \$9.50@60¢10¢  
Hotchkiss..... 30¢  
Nock's..... 30¢  
Romer's Nos. 0 to 91..... 30¢  
Romer's Scandinavian, &c., Nos. 100 to  
505..... 35¢  
Scandinavian..... 90¢50¢  
Slaymaker, Barry & Co.  
No. 1010 line..... 90¢  
No. 41 line..... 50¢  
No. 61 line..... 60¢  
No. 81 line..... 60¢  
No. 109 line..... 90¢10¢  
Star..... 60¢  
Yale Lock Mfg. Co.'s..... net prices  
Sash, &c.—  
Attwell Mfg. Co..... 25¢33¢4¢  
Champion Safety list January, 1898. 70¢  
Clark's No. 1, 610; No. 2, # gr..... 33¢4¢  
Clark's No. 1, 610; No. 2, # gr..... 33¢4¢  
Brzd..... 70¢  
Common Sense, Nickel Plated..... # gr \$10.00  
Corbin's Daisyl, list Feb. 15, 1886..... 70¢  
Davis Bros. Barnes Mfg. Co..... 60¢  
Ferguson..... 33¢4¢  
Flea's, Jacobsen's party, No. 100, # gr..... 50¢  
No. 105, # gr..... 50¢  
Giant, list Jan. 1892..... 70¢10¢  
Hammond's Window Springs..... 40¢  
Hugunin's New Sash Locks..... 25¢5¢2¢  
Hugunin's Sash Balances..... 25¢5¢2¢  
Ives' 110 line, # gr..... 60¢10¢5¢  
Kempshall's..... 60¢60¢10¢  
Kempshall's Model..... 60¢60¢10¢  
Monarch..... 50¢  
Payson's Perfect..... 60¢10¢10¢  
Reading..... 60¢10¢6¢10¢10¢  
Security..... 60¢10¢10¢  
Seidarsal..... 30¢  
Victor..... 60¢10¢6¢  
Walker's..... 50¢  
Wolcott's..... 60¢10¢5¢  
Lumber Tools—  
See Tools, Lumber.  
Lustro—  
Four-ounce bottles..... # doz, \$1.75; #  
gross..... \$17.00  
Machines.  
Boring—  
Without  
Angers, Upright. Angular.  
Boss, Carvers' 3.50  
Boss, Ship Bldrs' 3.85  
Douglas..... \$5.50 \$4.75..... 50¢  
Jennings..... 5.50 6.75..... 50¢5¢  
Millers Falls..... 7.50..... 25¢  
Phillips' Patent  
with Auger..... 7.00 7.50.....  
Snell's, Rice's Pat 5.50 6.75..... 40¢10¢10¢  
Fluting—  
American, 5 in., \$3.00; 6 in., \$3.40; 7 in.,  
\$4.50 each..... 35¢  
Combined Fluter and Saw Iron.....  
# doz \$15.00..... 30¢  
Crown, 4½ in., \$3.50; 6 in., \$4.00; 8 in.,  
\$6.50 each..... 35¢  
Crown Hand Fluter, Nos. 1, \$15.00; 2,  
\$12.50; 3, \$10.00; 4, \$8.25..... 30¢  
Crown Jewel, 6 in..... \$3.50 each, 35¢  
Domestic Fluter..... each, \$1.50  
Eagle, 8½-inch Rolls, \$2.15..... 35¢  
Eagle, 5½-inch Rolls, \$2.35..... 35¢  
Kn x, 4½-inch Rolls..... \$3.25 each, 35¢  
Kn x, 6-inch Rolls..... \$3.60 each, 35¢  
Hoisting—  
Moore's Anti-Friction Differential Pul-  
ley Block..... 20¢  
Moore's Hand Hoist, with Lock Brake 20¢  
Moore's Rope Differential Pulley  
Block..... 80¢  
Maris & Beekley (Teal Patent)..... 80¢  
See also Blocks.  
Washing—  
Fair and Square..... # doz \$42.00  
Anthony Wayne, # doz, No. 1, \$42; No.  
2, \$30; No. 3, \$42.....  
Wash American..... # doz \$38.00  
Wesell..... # doz \$54.00  
Western Star # doz, No. 2, \$38 No. 3  
\$39  
Mallets—  
B. & L. Block Co., Hickory & L. V.  
Fibre Head, Stearns..... 80¢10¢40¢  
Hickory..... 30¢  
Hickory..... 20¢10¢20¢10¢  
Munumvite..... 20¢10¢20¢10¢  
Mattocks—Regular list.  
60¢10¢60¢10¢5¢  
Measures—  
Standard Fibraware, No. 1, peck #  
dosen, \$3.50; 4½-peck, \$3.00  
Meat Cutters—  
Cutters, Meat

**Menders—**  
Harnes ..... \$ doz. \$1.75  
Hudson's Hose Menders, in set, \$ gr. doz. \$3.00

Hudson's Hose Bands..... \$ gr. doz. \$1.25

**Milk Cans—See Cans, 24th.**

**Mills—**

**Coffee—**  
Box and Bide. List, Jan. 1, 1888, 60¢ @ 60 & 10¢  
Net prices are often made when the prices are lower than above discount.

American, Enterprise Mfg. Co., list Jan. 1, 1888..... 20%  
National List, Jan. 1, 1894..... 30%  
Swift, Lane Bros..... 30%  
Wadell's New Box Mills, Ideal..... 30%  
Brand, New List..... 60¢ @ 60 & 10%

**Mincing Knives—**  
See *Knives, Mincing.*

**Molasses Gates—**  
See *Gates, Molasses.*

**Money Drawers—**  
See *Drawers, Money.*

**Mowers, Lawn—**  
Highest 10 in. 12 in. 14 in.  
grade, \$4.00 @ \$5.25 \$4.60 @ \$5.00 \$5.00 @ \$6.75  
Cheap..... \$3.25 \$3.25 \$3.50  
..... 2.25 2.50 2.75

**Muzzles—**  
Safety..... \$ doz. \$3.00, 25%

**Nails—**  
Cut and Wire. See Trade Report.  
Wire Nails, Papeled.  
Association list, May 1, '92..... 85 & 10¢  
..... 85 & 10¢ & 5¢  
Hungarian, Finishing, Upholsterers', &c.  
See *Tacks.*

**Horse—**  
Nos. 6 7 8 9 10  
A. C..... 25¢ 23¢ 21¢ 21¢ 21¢  
..... 40 & 10%  
American..... 9% 9% 9% 9% 9%..... net  
Anchor..... 9% 21¢ 20¢ 18%..... 35%  
Ausable..... 28¢ 26¢ 25¢ 24¢ 23¢  
..... 40 & 5¢  
Capewell..... 19¢ 18¢ 17¢ 16¢ 16¢..... 10 & 5%  
C. B. K..... 25¢ 23¢ 22¢ 21¢ 21¢  
..... 40%  
Champion..... 25¢ 23¢ 22¢ 21¢ 20¢  
..... 10 & 10 & 10%  
Champlain..... 28¢ 26¢ 25¢ 24¢ 23¢  
..... 40 & 5¢  
Clinton, Fin..... 19¢ 17¢ 16¢ 15¢ 14¢..... 30 & 5%  
Empire Bronzed..... 11¢ @ 11%  
Essex..... 28¢ 27¢ 25¢ 24¢ 23¢  
..... 40 & 10 & 5%  
Lyra..... 9% 9% 9% 9% 9%..... net  
Maud S..... 25¢ 23¢ 22¢ 21¢ 21¢  
..... 50 & 10 & 5%  
Northwest'n..... 25¢ 23¢ 22¢ 21¢ 20¢  
..... 25¢ @ 25 & 5%  
Putnam..... 23¢ 21¢ 20¢ 19¢ 18¢..... 15%  
Sweden..... 9% 9% 9% 9% 9%..... net  
Standard..... 23¢ 21¢ 20¢ 19¢ 18¢..... 15%  
Vulcan..... 23¢ 21¢ 20¢ 19¢ 18¢..... 25%  
Western..... 23¢ 21¢ 20¢ 19¢ 18¢..... 50%

**Picture—**  
Brass Head, Combination list..... 50 & 10%  
Brass Head, Sargent's list..... 60 & 60 & 10%  
Porcelain Head, Combination list..... 40 & 10%  
Porcelain Head, Sargent's list..... 50 & 10 & 10%  
Niles' Patent..... 40%

**Nail Puliers—See Puliers, Nail.**

**Nail Sets—See Sets, Nail.**

**Nippers—See Pliers and Nippers**

**Nut Crackers—**  
See *Crackers, Nut.*

**Nuts—List Dec. 18, 1889.**  
Square. Hex.  
Cold Punched..... 5.00¢ 6.10¢ off list  
Hot Pressed..... 5.80¢ 6.50¢ off list  
In packages of 100 lb, add 1-10¢  
net; in packages less than 100 lb, add  
¼¢ & lb, net.

**Oakum—**  
Best or Government..... \$ lb 6¼¢ @ 6¼¢  
Navy..... \$ lb 6¼¢ @ 6¼¢  
U. S. Navy..... \$ lb 6¼¢ @ 6¼¢

**Oil Tanks—See Tanks, Oil.**

**Oilers—**  
Brass and Copper..... 50 & 10¢ @ 50 & 10 & 5%  
Zinc..... 70¢ @ 70 & 5%  
Broughton's B's..... 50%  
Broughton's Zinc..... 60%  
Malleable, Hammers' Improved, No. 1,  
\$3.60; No. 2, \$4.00; No. 3, \$4.40 \$ doz.  
..... 10 & 5%  
Malleable, Hammers' Old Pattern, same  
size..... 60%  
Olmsted's Brass and Copper..... 60%  
Olmsted's Tin and Zinc..... 60%  
Prior's Pat. or "Paragon" Brass..... 60%  
Prior's Pat. or "Paragon" Zinc..... 70%  
Steel, Draper & Williams..... 60%  
Wilmot & Hobbs Mfg. Co., Steel Anti-  
Rust..... 60%

**Nailers, Can—**  
American..... \$ gross \$1.75 @ \$2.00  
Champion..... \$ doz \$2.00..... 50%  
Domestic..... \$ doz \$2.00..... 45%  
Duplex..... \$ doz \$2.50, 15¢ @ 20%  
Eureka..... \$ doz \$2.50, 15¢ @ 20%  
Excelsior, No. 1 \$2.60; No. 2, \$1.50..... 40%  
French, No. 1..... \$ doz \$2.55, 55¢ @ 60%  
Iron Blade, No. 1..... \$ doz \$2.00, 45¢ @ 50%  
Lyman's..... \$ doz \$3.75, 20¢  
Messenger's Comet..... \$ doz \$3.00, 25%  
Moore's..... 70%  
Sardine Scissors..... \$ doz \$2.75 @ \$3.00  
Sprague, No. 1, 55¢; 2, 60¢; 3, 65¢;  
Star..... \$ doz \$2.75  
Sensible, Japanned, per doz..... 60¢  
Sensible, Nickel, per doz..... 75¢  
Surprise, per doz..... 25¢  
New Sprague, Metallic H'dle, per doz 50¢  
New Sprague, Wood H'dle, per doz 60¢  
Universal..... \$ doz \$3.00..... 55 & 5%  
Ward, Best..... \$ gross No. 1, \$12.00  
No. 2, \$24.00; No. 3, \$36.00..... 50 & 10%

**Packing, Steam—**  
Rubber.  
Standard, fair quality..... 70 & 10¢ @ 75%  
Inferior quality..... 75 & 10¢ @ 80%  
Extra..... 60 & 5¢ @ 60 & 10 & 5%  
Jenkins' Standard..... \$ 80¢..... 25 & 5 & 5%  
N. Y. B. & P. Co., Double Diamond..... 60%  
N. Y. B. & P. Co., Salamander..... 45%  
N. Y. B. & P. Co., Carbon..... 70 & 5%

**Miscellaneous—**  
American Packing..... \$ 60¢ @ 100¢  
American Packing..... \$ 14¢ @ 100¢  
Italian Packing..... \$ 15¢ @ 100¢  
Jute..... \$ 60¢ @ 75¢  
Russia Packing..... \$ 15¢ @ 100¢

**Pails—Creamery—**  
S. S. & Co.'s 12-qt., \$7.00; 20-qt., \$7.95  
    " doz. 5%

**Galvanized Pails—**  
Light. Heavy.  
10 Quart. .... \$2.00 @ \$2.50 \$2.50 @ \$2.50  
12 Quart. .... 2.25 @ 2.50 2.50 @ 2.75  
14 Quart. .... 2.50 @ 2.75 2.75 @ 3.00

**Galvanized Buckets—**  
Fire. Well.  
10 Quart. .... \$2.50 @ \$3.75  
12 Quart. .... 2.75 @ 3.25 \$2.25 @ \$2.50  
14 Quart. .... 3.00 @ 3.25 2.50 @ 2.75

**Indurated Fiber Ware**  
Fire Pails, deep. .... \$ doz \$4.80  
Fire Pails, round bottom. .... \$ doz \$5.40  
Milk, 14 qt. .... \$ doz \$5.40  
Stable, 14 qt. .... \$ doz \$6.00  
Star Pails, 12 qt. .... \$ doz \$4.20

**Standard Fiber Ware**  
Buggy Pails. .... Plain. Deor'd  
Chamber Pails, 14 qt. .... 6.00 \$7.00  
Dairy Pails, 14 qt., " doz. 3.75 4.25  
Fire Pails, No. 1, 12 qt., " doz 3.75  
Fire Pails, No. 2, 14 qt., " doz 4.25  
Horse Pails. .... 7.00  
Victrola (bal. trap). .... 3.50  
Sugar Pails. .... 5.00 5.50  
Water Pails, 12 qt., " doz. 3.15 3.75

**Pans—**  
Large sizes. .... \$ D 5¢  
Small sizes. .... " D 5¢  
Silver & Co. (Covered). .... 40%

**Dripping—**  
Fry—  
Standard List:  
No. .... 1 2 3 4  
" doz. \$5.00 \$3.75 \$4.25 4.75 \$5.25  
No. .... 5 6 7 8  
" doz. .... \$6.00 \$7.00 \$7.50 \$9.00  
Polished, regular goods. .... 70¢ @ 75¢ @ 10¢  
Aome Fry Pans. .... 60%

**Dust—**  
Steel Edge, No. 1. .... \$ doz \$1.75

**Roasting and Baking—**  
Columbian, S. S. & Co.'s Nos. 10, \$2; 20,  
\$2.25; 30, \$2.50 each. .... 60¢ @ 10%

**Paper and Cloth—**  
Sand and Emery—  
List April 19, 1888. .... 50¢ @ 10¢ @ 80%  
Sibley's Emery and Crocus Cloth. .... 30%

**Parers—**  
Apple—  
Advance. .... \$ doz \$4.25  
Baldwin. .... " doz 4.75  
Bonanza. .... each 5.00  
Daisy. .... " doz 3.50  
Dandy. .... each 7.50  
Eclipse. .... " doz 4.00  
Eureka, 1888. .... each 16.00  
Family Bay State. .... " doz 12.00  
Victrola. .... each 4.00  
Gold Medal. .... " doz 4.00  
Ideal. .... " doz 4.00  
Improved Bay State. .... " doz 27.00 @ 30.00  
Little Star. .... " doz 4.00  
Monarch. .... " doz 13.50  
No. 1 Lightning. .... " doz 5.50  
Victrola. .... " doz 4.00  
Penn. .... " doz 3.00  
Perfection. .... " doz 4.00  
Reading 72. .... " doz 3.75  
Reading 78. .... " doz 6.75  
Rocking Table. .... " doz 5.50  
Turn Table. .... " doz 13.00  
Waverly. .... " doz 4.00  
White Mountain. .... " doz 4.00

**Potato—**  
Antrim Combination. .... \$ doz \$5.50  
Saragota. .... " doz \$5.50  
White Mountain. .... " doz \$4.50

**Pencils, Soapstone—**  
See Crayons.

**Pickers, Fruit—**  
Prize Fruit Pickers. .... 50%

**Picks—**  
Railroad or Adze Eye, 5 to 6, \$12.00; 6  
to 7, \$15.00. .... 60¢ @ 10¢ @ 70%

**Picture Nails—**  
See Nails, Picture.

**Pinking Irons—**  
See Irons, Pinking.

**Pins—**  
Bow—  
Humason, Beckley & Co.'s. .... 70¢ @ 70¢ @ 10%  
Peck, Stow & W. Co. .... 60¢ @ 60¢ @ 10%  
Sargent & Co.'s, \$17 and \$18. .... 60¢ @ 10¢ @ 60¢ @ 10¢ @ 10%

**Escutcheon—**  
Brass. .... 70%  
Iron, list Nov. 11, 1885. .... 75%

**Pipe, Wrought Iron—**  
List April 13, 1893.  
14 and under, Plain. 57% @ 10¢ @ 10¢ @ 10%  
14 and under, Galv. .... 50¢ @ 10¢ @ 10¢ @ 10%  
14 and over, Plain. .... 67% @ 10¢ @ 10¢ @ 10%  
14 and over, Galv. .... 57% @ 10¢ @ 10¢ @ 10%  
Boiler Tubes, list Oct. 24, 1892. .... 65¢ @ 10¢ @ 10¢ @ 10%  
Casing, list Nov. 10, 1892. .... 62% @ 10¢ @ 10¢ @ 10%  
Cold Drawn Seamless Steel Tubing. .... 60%  
Inverted Joints Casing, list Nov. 18,  
1892. .... 67% @ 10¢ @ 10¢ @ 10%  
Steel Boiler Tubes. .... 27% @ 10¢ @ 10¢ @ 10%

**Planes and Plane Irons—**  
Wood Planes—  
Molding. .... 50¢ @ 10%  
Bench, First quality. .... 55¢ @ 10%  
Bench, Second quality. .... 60¢ @ 10¢ @ 10%  
Bailey's (Stanley R. & L. Co.). .... 50¢ @ 10%  
Iron Planes—  
Bailey's (Stanley R. & L. Co.). .... 50¢ @ 10%  
Birmingham Plane Co. 60¢ @ 10¢ @ 10¢ @ 10%  
Chaplin's Iron Planes. .... 50¢ @ 10¢ @ 50¢ @ 10%  
Davis' Iron Planes. .... 50¢ @ 50¢ @ 5%  
Gage Tool Co.'s Self-Setting. .... 35%  
Miscellaneous Planes (Stanley R. & L.  
Co.). .... 25¢ @ 10%  
Sargent's. .... 80¢ @ 10¢ @ 10%  
Stanley & Co. .... 50¢ @ 10¢ @ 10¢ @ 10%  
Steers' Iron Planes. .... 50¢ @ 10¢ @ 50¢ @ 10%  
Plane Irons—  
Anburn Thistle. .... 30¢ @ 10¢ @ 30¢ @ 10¢ @ 10%  
Buck Bros. .... 30¢  
Butcher's. .... \$5.00 @ \$5.25 to 10¢  
Ohio. .... 30¢ @ 10¢ @ 30¢ @ 10¢ @ 10%  
Sandusky. .... 50¢ @ 10%  
Stanley & Co. .... 50¢ @ 10%  
L. & J. J. White. .... 30%

**Plates—**  
Galvanized. .... \$ D 4¢ @ 10%

<b>Pliers and Nippers—</b>		
Pliers Patent.....	90¢	
Carew's Pat. Wire Cutters.....	20¢	
Cronk's 8 in., \$15.00; 10 in.....	\$20 60¢	
Cronk's Button Pattern.....	10¢1025¢	
Cronk's Cutter Pliers.....	60¢10085¢	
Eurotek Pliers and Nippers.....	60¢	
Case Pliers.....	60¢	
Gas Pliers, Custar's Nickel Plated.....	60¢25¢	
Hail's Pliers, No. 2, 5 in., \$13.50; No. 4, 7 in., \$21.00; # doz.....	40¢10¢	
Hall's Pliers.....	65¢	
Humanson & Beckley Mfg. Co. 50a60a10a		
Hammer's Giant, No. 55, 6 in., # doz.....	10¢10	
10¢.60.	35¢15¢	
Morrill's Parallel, # doz.....	\$12.00 30¢25¢	
P. S. & W. Cast Steel.....	50¢50¢25¢	
P. S. & W. Timmers' Cutting Nippers, add 6¢.....	25¢	
Russell's Patent.....	25¢	
Wabury Nip'r 5 in., # doz.....	\$7.50 33¢15¢	
<b>Plumbs and Levels</b>		
Regular List.....	75¢10¢80¢	
Cook's.....	40¢10¢	
Davis Inclinoimeters.....	10¢10¢	
Davis Iron Levels.....	30¢	
Disston's.....	70¢10¢70¢10¢10¢	
Stanley's Level.....	20¢10¢10¢	
Stanley's Duplex.....	20¢10¢10¢	
Stanley's Handy.....	20¢10¢	
<b>Poachers, Egg—</b>		
Buffalo Steam Egg Poachers, # doz.....		
No. 1, \$6.00; No. 2, \$9.00.....	35¢15¢	
Silver & Co., 6-Ring, # doz.....	\$4.00 5¢	
Ring.....	\$2.00	
<b>Pokes Animal—</b>		
Bishop's American.....	# doz \$3.00	
Bishop's X. L. X.....	# doz \$5.00	
Behr's Steel Monarch.....	# doz \$5.00	
Bishop's Ohio.....	# doz \$6.00	
Bishop's Pioneer.....	# doz \$3.75	
Bolding.....	# doz \$5.00	
Buckeye Single Stale.....	# doz \$2.50	
Columbian Double Stale.....	# doz \$5.00	
Eagle, Double Stale.....	# doz \$5.00	
Eagle, Single Stale.....	# doz \$3.25	
Metallie Horse Pokes.....	# doz \$5.00	
<b>Police Goods—</b>		
Daley's Improved Handcuffs; 2 Hands, Polished, # doz.....	\$48.00	
Nickeled.....	\$57.00; 3 hands, Polished, # doz \$72.00; Nickeled, \$84.00.....	25¢
J. P. Lovell's Police Goods.....	25¢	
Newhall Ship Chandlery Co., Hand cuffs, # doz.....	25¢	
Towers.....	25¢	
<b>Polish—</b>		
<b>Metal—</b>		
Gaston's Silver Compound.....	33¢15¢	
Prestoline.....	30¢	
Prestoline Paste.....	33¢15¢	
Tanite Mills.....		
Paste, # lb tins.....	# gr., \$14.40	
Paste, # lb tins.....	# gr., \$38.00	
Liquid, # apt.....	# gr., \$38.00	
Powder, 1 lb.....	# gr., \$38.00	
Wynn's White Silk, # apt, cans.....	# doz, \$1.57	
<b>Stove—</b>		
Black Eagle Benzine Paste, 5 and 10 lb cans.....	12¢15¢	
Black Jack Bottles.....	# gro \$7.20 10¢	
Black Fire, 5 and 10 lb pails.....	# 8	
Black Jack Water Paste, 5 and 10 lb cans.....	12¢15¢	
Bonnell's Liquid Stove Polish.....	# gro \$9.00	
Bonnell's Paste Stove Polish.....	# gro \$8.00	
Boynton's Noon Day.....	# gro, \$13.00	
Crown Paste.....	# gro \$7.20	
Crown Fire, 5 and 10 lb pails.....	# 8	
Diamond O. K. Enamel.....	# gro \$19.00	
Diamond Rock Nickel Cleaner.....	# gro \$10 20	
Joseph Dixon's.....	# gro, \$6.00, 10¢ 15¢	
Dixon's Plumbago.....	# gro \$2.50	
Freiside.....	# gro \$2.50	
Gold Metal.....	# gro, \$6.00, 25¢	
Japanese.....	# gro \$3.50	
Jet Black.....	# gro \$3.50	
Lustro.....	# gro, \$4.75	
Nickel Plate Paste.....	# gro \$6.00	
Parlor Pride Stove Enamel.....	# gro, \$12.00	
Raven Liquid, 6 oz. bottles.....	# gro \$9.00	
Raven Liquid, 8 oz. bottles.....	# gro \$9.00	
Raven Paste in 5 lb. pails (cases of 6 pails).....	# 10¢	
Raven Water Polish, large boxes.....	20¢	
Rising Sun.....	# gro, \$5.50 \$5.75	
Ruby.....	# gr, \$3.75	
Sun Paste No. 10.....	# gr, \$7.20	
Sun Paste No. 6.....	# gr, \$5.50	
Wynn's Black Silk, 5 lb pail.....	# 15¢	
Wynn's Black Silk, 5 lb box.....	# gro, \$12.00	
Wynn's Black Silk, 5 lb box.....	# gro, \$10.00	
Wynn's Black Silk, 8 oz. liq.....	# gro, \$12.00	
Yates' Liquid.....	# 8 10 gal	
Yates Standard Paste Polish, 10 lb cans, # 12½; 5; 10 lb cans, # 10½		
<b>Poppers Corn—</b>		
Round or Square, 1 qt.....	# doz \$1.00; # gr \$8.00	
1 qt.....	# doz \$1.00; # gr \$9.00	
1 qt.....	# doz \$1.50; # gr \$14.00	
<b>Post Hole and Tree Augers and Diggers—</b>		
See <i>Diggers, Post Hole, &amp;c.</i>		
<b>Potato Parers—</b>		
See <i>Parers, Potato.</i>		
<b>Pots— Glue—</b>		
Enameled.....	40¢10¢40¢10¢15¢	
Family, Howe's "Eureka".....	40¢	
Family, F. C.'s "Hand".....	50¢	
Enamel.....	40¢10¢40¢10¢15¢	
<b>Powder—</b>		
<b>In Canisters—</b>		
Duck, 1 lb each.....	45¢	
White Sporting, 1 lb each.....	75¢	
Rifle, 1 lb each.....	15¢	
Rifle, 1 lb each.....	25¢	
<b>In Kegs</b>		
Duck, 64 lb kegs.....	\$2.25	
Duck, 124 lb kegs.....	\$4.25	
Duck, 25 lb kegs.....	\$2.00	
Rifle, 64 lb kegs.....	\$1.10	
Rifle, 124 lb kegs.....	\$1.90	
Rifle, 25 lb kegs.....	\$3.25	
<b>Presses—</b>		
<b>Fruit and Jelly—</b>		
Enterprise Mfg. Co.....	35¢	
Henls.....	# gr \$36.00	
Shepard's Queen City.....	40¢	
Willow.....	# doz \$5	
<b>Pulling Hooks and</b>		
<b>Winders—</b>		

**Pullers Nail—**

Belts, No. 1..... \$24.00, 60¢  
 Economy..... \$25.00, 60¢  
 Elrich, No. 1..... \$10.00, 10¢  
 Giant, No. 2..... \$18.00, 10¢  
 Pelican..... \$15.00, 10¢  
 Soranton..... \$13.00, 33¢

**Pulleys—**

Brass Screw..... 70¢  
 Hay Fork, "Anti-Friction," 5 in. solid..... \$1.70  
 Hay Fork, "F" Common and Patent..... 50¢  
 Bushed..... 20¢  
 Hay Fork, Moore's Anti-Friction 5 in. Wheel..... \$12.00, 40¢  
 Hay Fork, Keed's Self-Lubricating..... 60¢  
 Hay Fork, Solid Eye..... \$4.00, 50¢  
 Hay Fork, Stearns' Nos. 35 & 45..... 50¢  
 Hay Fork, Stearns' Nos. 15, 25, 50, 60, 60¢  
 Hay Fork, Tarbox Pat. Iron..... 20¢  
 Hot House, Awning..... 70¢  
 Japanned Clothes Line..... 10¢  
 Japanned Screw..... 70¢  
 Japanned Side..... 70¢  
 Moore's Ceiling or End, Anti-Friction..... 40¢  
 Moore's Dumb Waiter, Anti-Friction..... 40¢  
 Moore's Electric Light..... 30¢  
 Moore's Side, Anti-Friction..... 50¢  
 Seal (Anger Mortise)..... 60¢  
 Empire..... 60¢  
 Aome..... 60¢  
 Ideal, Nos. 2, 4, 10 & 15..... 60¢ less 1¢  
 Star..... 60¢  
 Ideal, or LXL No. 60..... \$22¢ net.  
 On bbl. lots extra 5¢.  
 Shade Rack..... 45¢  
 Shepard's Niagara, No. 25..... \$25¢  
 Tackle Blocks—See Blocks.

**Pumps—**

Clister, Best Makers..... 60¢  
 Pitcher Spout, Best Makers..... 70¢  
 Pitcher Spout, Cheaper G'ds..... 75¢  
 Myers' Pumps, low list..... 50¢

**Punches—**

Avery's Revolving..... 40¢  
 Avery's Sawset and Punch—See Sawsets  
 Bemis & Call Co.'s Cast Steel Drive..... 50¢  
 Bemis & Call Co.'s Check..... 50¢  
 Bemis & Call Co.'s Spring..... 50¢  
 Bemis & Call Co.'s Springfield Socket..... 50¢  
 Niagara Hollow Punches..... 20¢  
 Niagara Solid Punches..... 50¢  
 Rice Hand Punches..... 15¢  
 Baddler's or Drive, good..... \$2.50  
 Spring, good quality..... \$2.50  
 Spring, Leach's Pat..... 15¢  
 Solid Timmers, P., S. & W. Co.'s..... \$1.44  
 Timmers' Hollow Punches, P., S. & W. Co.'s..... 20¢

**Rail—**

Barn Door, Light, In..... \$1.75  
 Per 100 feet..... \$2.10  
 B.D. for N. E. Hangers..... 2.75  
 Small, Med. Large..... 2.50  
 Carrier, double braced, Steel Rail..... 30¢  
 Foot..... 30¢  
 Lundy Parlor Door, Planed Edge, 7 ft..... 70¢  
 Moody Steel Rail 7 ft..... 45¢  
 Moore's Steel Rail..... 35¢  
 Sliding Door, Bronzed Wrt Iron, 7 ft..... 60¢  
 Sliding Door, Iron, Painted..... 50¢  
 Sliding Door, Wrt Brass, 7 ft..... 35¢  
 Terry's Steel Rail..... 50¢  
 Victor Track Rail, 7 ft..... 50¢

**Rakes—**

Cast Steel, Association G'ds..... 70¢  
 Cast Steel, outside G'ds..... 70¢  
 Malleable, good..... 70¢  
 Malleable, low grade..... 75¢  
 Fort Madison Prize Bow Brace and Feetless..... 50¢  
 Fort Madison Steel Tooth Lawn Rake..... \$3.00  
 Gibbs..... \$4.00  
 Gibbs' Acme Lawn Rake..... \$4.75  
 Gibbs' Canton Lawn Rake..... \$3.75  
 Gibbs' Crown Lawn Rake, No. 1..... \$4.00  
 Gibbs' Favorite Lawn Rake..... \$3.50  
 Gibbs' Hustler No. 0..... \$4.00  
 Gibbs' Hustler No. 1..... \$4.40  
 Oneida Lawn Rake..... \$6.00

**Razors—**

Campbell Cutlery Co..... 50¢  
 Electric Cutlery Co..... Net prices  
 Galvanic..... \$15.00  
 Jordan's AAA1, new list..... Net prices  
 Jordan's Old Faithful, new list..... Net prices  
 J. B. Torrey & Co..... Net prices  
 Wostenholm and Butcher, \$10 to 2..... 10¢

**Razor Straps—**

See Straps, Razor.  
 Clothes Line—  
 Stearns'..... 33¢

**Reels—**

Fishing  
 Hendryx Aluminum German Silver, Gold, Bronze, Silver Rubber, Poplar and Salmon, Single Action, Multiplying and Quadruple, all sizes..... 25¢  
 Hendryx Single Action Series, 102P and PN, 202P and PN, 102PR and PRN, 202PR and PRN, 204P and PN, 204PR and PRN, 2024N and PN, 2024PR and PN, 2024N and PN, 2024PR and PN..... 50¢  
 Hendryx Multiplying and Quadruple Series, 3004N and PN, 4N and PN, 204N and PN, 204PR and PN, 2024N and PN, 2024PR and PN..... 50¢  
 Moore's Bronze Finishes..... 70¢  
 Moore's Electroplated..... 75¢  
 Moore's Japanned..... 75¢  
 Moore's Solid Bronze..... 65¢  
 Moore's Stove Pipe..... 30¢

**Registers—**

Moore's Bronze Finishes..... 70¢  
 Moore's Electroplated..... 75¢  
 Moore's Japanned..... 75¢  
 Moore's Solid Bronze..... 65¢  
 Moore's Stove Pipe..... 30¢

**Rings and Ringers—**

Bull Rings—  
 Hotchkiss' low list..... 40¢  
 Humason, Beckley & Co.'s..... 75¢  
 Peck, Stow & W. Co.'s..... 80¢  
 Sargent's..... 80¢

**Hog Rings and Ringers—**

Note.—The market on Hog Rings and Ringers is in a demoralized condition and prices are low and irregular. We therefore withdraw quotations for the present.

**Rivets and Burrs—**

Copper..... 60¢  
 Coppered Iron, Best Brand..... 50¢  
 Iron Norway, List Nov. 17 '87..... 55¢  
 Second Quality..... 70¢

**Rivet Sets—See Sets.****Roasting and Baking****Pans—See Pans, Roasting and Baking.****Rods—**

Star, Black Walnut..... \$20.00  
 Star, Brass..... 25¢

**Rollers—**

Aome Moore's Anti-Friction..... 55¢  
 Barn Door, Sargent's List..... 60¢  
 Moore's Barn Door Stay..... 50¢  
 Union Barn Door Roller..... 70¢  
 Thompson Mfg. Co.'s Lawn Rollers..... 30¢

**Rope—The following prices are f.o.b.**

New York or factory, and are shaded 1/4¢ on large lots; terms 1 1/4% for cash.  
 Manila, 7-16 in. diam. and larger..... 8 @ 8 1/4¢  
 Manila, 1/2 in. and 5-16 in. diam..... 8 @ 8 1/4¢  
 Manila, Tarred Rope..... 7 1/4 @ 7 1/4¢  
 Manila, Hay Rope, Med'm..... 8 @ 8 1/4¢  
 Sisal, 7-16 in. and larger..... 6 @ 6 1/4¢  
 Sisal, 1/2 in. and 5-16 in. diam..... 7 @ 7 1/4¢  
 Sisal, Hay Rope..... 6 @ 6 1/4¢  
 Sisal, Tarred Rope..... 5 1/4 @ 5 1/4¢  
 Sisal, Medium Lath Yarn..... 5 1/4 @ 5 1/4¢  
 New Zealand..... 7-16 in. and larger..... 5 1/4 @ 5 1/4¢  
 New Zealand, 1/2 in. and 5-16 in. diam..... 5 1/4 @ 5 1/4¢  
 New Zealand, Hay Rope..... 5 1/4 @ 5 1/4¢  
 New Zealand, Tar'd Rope..... 4 1/4 @ 5 1/4¢  
 Cotton Rope..... 12 @ 15¢  
 Jute Rope..... 6 @ 6 1/4¢

**Wire—**

List February, 1892. All kinds..... 50¢

**Rules—**

Boxwood..... 30¢  
 Ivory..... 50¢  
 Starrett's Steel Rules and Straight Edges..... 25¢

**Sad Irons—See Irons, Sad.****Sand and Emery Paper and Cloth—**

See Paper and Cloth.

**Sash Cord—See Cord, Sash.****Sash Locks—See Locks, Sash.****Sash Weights—**

See Weights, Sash.

**Sausage Stuffers or Fillers—See Stuffers or Fillers, Sausage.****Saws—**

Note.—Extra 5¢ on 10¢ often given.

Atkins' Circular..... 50¢  
 Atkins' Band..... 50¢  
 Atkins' Cross Cut, new list..... 40¢  
 Atkins' Mulay, Mill and Drag..... 50¢  
 Atkins' One-Man Saw..... 40¢  
 Atkins' Wood Saws..... 40¢  
 Atkins' Hand Compass, &c..... 40¢  
 Disston's Circular..... 45¢  
 Disston's Cross Cut, list Jan. 1, '93..... 45¢  
 Disston's Hand..... 25¢  
 O Cross Cuts, & Jones & Co.'s..... 45¢  
 Peace Circular and Mill..... 45¢  
 Peace Cross Cut, list Jan. 1, '93..... 45¢  
 Peace Hand, Panel and Rip..... 25¢  
 Richardson's Circular and Mill..... 45¢  
 Richardson's X Cuts, list Jan. 1, '93..... 45¢  
 Richardson's Hand, &c..... 25¢  
 Simonds' Circular Saws..... 45¢  
 Simonds' Crescent Ground Cross Cut Saws..... 30¢  
 Simonds' One Man Cross Cuts..... 40¢  
 Simonds' Gang, Mill, Mulay and Drag Saws..... 45¢  
 Wheeler, Madden & Clemson Mfg. Co. Cross Cuts, list Jan. 1, 1893..... 45¢  
 Hand, Panel and Rip..... 25¢  
 Woodrough & McFarlin Cross Cuts, list Jan. 1, 1893..... 45¢  
 Hand, Panel and Rip..... 25¢

**Hack Saws—**

Eureka and Crescent..... 25¢  
 Griffin's, complete..... 40¢  
 Griffin's Hack Saw Blades..... 40¢  
 Star Hack Saws and Blades..... 25¢

**Scroll—**

Barnes' Builders' and Cab Makers' \$15.25  
 Barnes' Scroll Saw Blades..... 25¢  
 Lester, complete, \$10.00..... 25¢  
 Rogers, complete, \$4.00..... 25¢

**Saw Frames—**

See Frames, Saw.

**Saw Sets—See Sets, Saw.****Saw Tools—See Tools, Saw.****Scale Beams—**

See Beams, Scale.

**Scales—**

Chatillon's Eureka..... 25¢  
 Chatillon's Favorite..... 40¢  
 Chatillon's Grocers' Trip Scales..... 50¢  
 Family Turnbills..... 30¢  
 Hatch, Counter, No. 171, good quality..... \$17.00  
 Hatch Tea, No. 161..... \$17.00  
 Riehle Bros' Platform..... 40¢  
 Union Platform Plain..... \$2.00  
 Union Platform, Striped..... \$2.15  
 Standard..... 50¢

**Scissors, Fluting—**

45¢

**Scrapers—**

Adjustable Box Scraper (S. R. & L. Co.)..... \$6.00  
 Box, 1 Handle..... \$3.00  
 Box, 2 Handle..... \$3.00  
 Defiance Box and Ship..... 20¢  
 Foot..... 50¢  
 Ship, R. I. Tool Co..... \$3.50

**Screen Window and Door**

Frames—See Frames

**Screw Drivers—**

See Drivers, Screw.

**Screws—****Bench and Hand—**

Bench, Iron..... 55¢  
 Bench, Wood, Beech..... 25¢  
 Bench, Wood, Hickory..... 20¢  
 Hand, Wood..... 25¢  
 Hand, Grand Rapids, list..... 35¢

**Coach, Lag and Hand-Rail—**

Lag, Blunt Point, list Jan. 1, 1890..... 80¢  
 Coach and Lag, Gimlet Point, list Jan. 1, 1890..... 80¢  
 Hand Rail, H. & B. Mfg. Co.'s..... 75¢  
 Hand Rail, Sargent's..... 70¢

**Jack Screws—**

Millers Falls..... 50¢  
 Millers Falls, Koller..... 50¢  
 P. S. & W..... 35¢  
 Sargent..... 70¢  
 Stearns..... 40¢

**Cork—**

Detroit Cork Screw Co..... 33¢  
 Humason & Beckley Mfg. Co..... 40¢  
 William's Corked Worm..... 35¢  
 Wood Handle, 7 ft..... \$5.00  
 Wood, \$5.50

**Machine—**

List August 1, 1894.  
 Flat Head Iron..... 45¢  
 Round Head Iron..... 40¢

**Wood—**

List January 1, 1891.  
 Flat Head Iron..... 85¢  
 Round Head Iron..... 75¢  
 Round Head Brs..... 75¢  
 Flat Head Bronze..... 80¢  
 Round Head, Bronze..... 75¢  
 Rogers' Drive Screws..... 87¢

**Scroll Saws—See Saws, Scroll.****Scythes—**

Grain..... 40¢  
 Grass..... 40¢

**Scythe Snaths—**

See Snaths, Scythe.

**Sets—**

Alken's Sets, A. Wils and Tools, No. 20, \$10.00..... 60¢  
 Common Brad Sets, No. 42, \$10.50; No. 43, \$12.50..... 70¢  
 Fray's Adj. Tool Hds., Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9; 5, \$7..... 50¢  
 Henry's Combination Haft..... \$20.50  
 Millers Falls Adj. Tool Hds., No. 1, \$12; No. 4, \$12; No. 5, \$18..... 25¢  
 Stanley's Ezelor, No. 2, \$4.00; No. 3, \$5.50..... 30¢

**Nail—**

Round..... \$3.25  
 Square..... \$4.00  
 Buck Bros..... 27¢  
 Cannon's Diamond Point..... \$12.20

**Rivet—**

Regular list..... 70¢

**Saw—**

Atkin's Criterion..... \$3.00  
 Atkin's Genuine..... \$13.00  
 Atkin's Imitation..... \$3.25  
 Avery's Saw Set and Punch..... \$8.00  
 Bemis & Call Co.'s Cross Cut..... 30¢  
 Bemis & Call Co.'s Plate..... 20¢  
 Bemis & Call Spring Hammer..... 30¢  
 Common Lever..... \$2.00  
 Crescent..... \$3.00  
 Disston's Star..... 25¢  
 Hammer, Bemis & Call Co.'s new Pat..... 45¢  
 Hammer, Hotchkiss..... \$5.50  
 Hart's Pat. Lever..... 20¢  
 Kohler's Giant Royal..... \$12.00  
 Leach's, No. 0, \$8.00; No. 1, \$15..... 15¢  
 Leopold..... 40¢  
 Lloyd's Acme..... \$15.00  
 Morrill's No. 1, \$15.00..... 40¢  
 Nos. 3 and 4, Cross Cut, \$23.00..... 40¢  
 No. 6, Mill, \$31.00..... 40¢  
 No. 10, 15¢  
 No. 11, \$16.00..... 40¢  
 Nash's..... 20¢  
 Stillman's Genuine..... \$5.00  
 Stillman's Pattern, Hand, \$3.25; Cross Cut, \$5.50..... 55¢  
 Taintor Positive..... \$18.00

**Sharpeners, Knife—**

Parkin's..... \$2.00  
 Wood Handles..... \$2.00  
 Tanite Mills..... \$14.40

**Shaves, Spoke—**

Iron..... 45¢  
 Bailey's (Stanley B. & L. Co.)..... 50¢  
 Cincinnati..... 25¢  
 Goodell's..... \$2.00  
 Stearns..... 40¢

**Shears—**

Acme Cast Shears..... 10¢  
 American (Cast) Iron..... 5¢  
 Barnard's Lamp Trimmers..... \$3.75  
 Barnard, Solid Steel Blade, Jap'd..... 75¢  
 Barnard, Solid Steel Blade, Nickleplated..... 80¢  
 Cast Steel Trimmers..... 80¢  
 First quality..... 80¢  
 Second quality..... 80¢  
 Campbell Cutlery Co., Jap'd..... 75¢  
 Nickel Plated..... 85¢  
 Claus brand, Japanned..... 70¢  
 Clipper..... 10¢  
 Davenport Cutlery Co..... 60¢  
 Diamond Cast Shears..... 10¢  
 Galvanic 2 1/2 in. x 9 in. x 1/4 inch Hatch Cutlery Co. Solid Steel Forged..... 60¢  
 Heinisch's, List Dec. 1891..... 60¢  
 Heinisch's Tailor's Shears..... 33¢  
 Howe Bros. & Hulbert, Solid Forged Steel..... 40¢  
 Seymour's, List Dec. 1891..... 60¢  
 Victor Cast Shears..... 75¢

**Timbers' Snips—**

Cass Handles, Laid with Steel..... 40¢  
 Niagara Snips and Shears..... 30¢  
 Wrt. Handles, Steel Blades..... 20¢

**Pruning Shears and Hooks**

Disston's Combined Pruning Hook and Saw..... \$18.00  
 Disston's Pruning Hook..... \$12.00  
 Dunlap's Saw and Chisel..... \$8.50  
 Henry's Pruning Shears..... \$2.50  
 Henry's Tree Pruner..... \$2.50  
 E.S. Lee & Co.'s Pruning Tools..... \$2.50  
 Levin Pruner No. 1, \$15.00..... 40¢  
 Levin Pruner No. 2, \$21.00..... 40¢  
 J. Mallinson & Co., No. 1, \$5.25; No. 2, \$7.25  
 Pruning Shears, Henry's Pat..... \$3.00  
 Pruning Shears, Conn. Pat..... \$2.50  
 P. S. & W. Co..... 60¢  
 Wheeler, M. & C. Co., Combination..... \$12.00

**Timmers' &c.—**

Snips, J. Mallinson & Co..... 55¢

**Sheaves—**

Corbin's list..... 60¢  
 M. W. Co., list Jan. 1893..... 50¢  
 Moore's Anti-Friction..... 50¢  
 Patent Roller..... 60¢  
 Patent Roller, Hatfield's..... 75¢  
 R. & E., list Dec. 18, 1885..... 55¢  
 Russell's Anti-Friction, list Dec. 18, 1885..... 60¢

**Sliding Shutter—**

Reading list..... 60¢  
 R. & E., list Dec. 18, 1885..... 60¢  
 Sargent's list..... 70¢

**Shells—**

Brass Shot Shells, Club, Rival, Climax..... 65¢  
 Brass Shot Shells, 1st quality..... 60¢  
 First quality 4, 8, 10 and 12 gauge..... 25¢  
 First quality Rival, Club and Climax brands, 14, 16 and 20 gauge (27.50 list)..... 20¢  
 Prime..... 40¢  
 Smokeless brand, 12, 10, 16 gauge..... 35¢  
 Star, Club, Rival and Climax Brands..... 35¢  
 Trap brand, 12 and 10 gauge..... 35¢  
 Shells, Loaded—  
 Standard List, July 19, 1890..... 40¢  
 2¢ cash, 10 days.

**Ship Tools—**

L. & I. J. White..... 20¢

**Shoes, Horse Mule, &c.—**

Burden's, Perkins', Phoenix, Standard, Diamond State, Bryden's Boss and Crescent..... \$3.50  
 Bryden's Frog Frogs, at factory \$5.00

**Mule—**

Add \$1 per keg to above prices.

**Ox Wrought—**

Ten lots..... \$2.50  
 1000 lb lots..... \$2.50  
 500 lb lots..... \$2.50

**Shot—**

Drop, up to B, 5-b bag..... \$1.10  
 Drop, up to B, 5-b bag..... 50¢  
 Drop, B and larger, 25-b bag..... 1.40  
 Drop, B and larger, 5-b bag..... 35¢  
 Buck and Chilled, 5-b bag..... 1.40  
 Buck and Chilled, 5-b bag..... 35¢  
 Dust Shot, 25-b bag..... 1.75  
 Dust Shot 5-b bag..... 40¢

**Shovels and Spades—**

Ames' Shovels, Spades, &c., list Nov. 1, 1885 (Except Nos. named below)..... 20¢  
 The following Nos. are subject to a discount of 27 1/2%: Nos. 548 to 572; 838 to 880; and Nos. 1004, 1009, 1014, 1019, 1024, 1027 and 1029.  
 Griffith's Black Iron..... 50¢  
 Griffith's C.S..... 60¢  
 Griffith's Solid C. S. R. R. Goods..... 20¢  
 Hubbard & Co., Antrim list..... 25¢  
 Hubbard & Co.'s Chisholm Pattern..... 50¢  
 Hussey, Blans & Co..... 10¢  
 H. M. Myers Co..... 50¢  
 Lehigh Mfg. Co..... 50¢  
 St. Louis Shovel Co..... 20¢  
 Payne Pettibone & Son..... 35¢  
 Remington's (Lowman's) Pat..... 40¢  
 Rowland's Black Iron..... 50¢  
 Rowland's Steel..... 60¢  
 Terre Haute Shovel & Tool Co..... 35¢

**Shovels and Tongs—**

Brass Head..... 50¢  
 Iron Head..... 50¢

**Sieves and Sifters—**

A. & W. Sifters..... \$15.00  
 Buffalo Metallic, S. & S. Co..... 50¢  
 Electric Light..... \$1.50  
 Hunter's Genuine..... \$1.75  
 Hunter's Imitation..... \$1.50  
 Mann's Tin Rim..... \$1.50  
 Shaker (Barber's Pat.) Flour Sifters..... \$21.00

**Sieves, Wooden Rim—**

Mesh 18, Nested, \$2.00..... \$1.00  
 Mesh 20, Nested, \$2.00..... 1.10  
 Mesh 24, Nested, \$2.00..... 1.15

**Sinks—**

Cast Iron..... 65¢

**Wrought Steel—**

Columbus, Galvanized and Enameled..... 50¢  
 Columbus Painted..... 50¢  
 New Era, Painted..... 50¢  
 New Era Galvanized and Enameled..... 70¢

**Skells, Thimble—**

Western list..... 75¢  
 Coldbrookdale Iron Co..... 80¢  
 Columbus Wrt. Steel, Special net prices..... 75¢  
 Seneca Falls Pattern..... 75¢  
 Utica P. S. T. Skells..... 20¢  
 Utica Turned and Fitted..... 35¢

**Slates—**



## Trimmers, Spoke-

Bonney's	do \$10.00, 50%	50%
Ives', No. 1, \$15.00; No. 2, \$12.00	do	50%
		56210%
Stearns'	do \$10.00, 50%	50%
Douglas'	do \$9.00, 25%	25%
Cincinnati		25%
<b>Bricks</b>		
Brace & Rickard	25¢ to 35¢	35%
Clement & Maynard's	20¢ to 25¢	25%
Diston's Brk and Plastering	25¢ to 35¢	35%
Lothrop's Brick and Plastering	20¢ to 25¢	25%
Peace's Plastering	25¢ to 35¢	35%
Reed's Brick and Plastering	15¢	15%
Rose's Brick	25¢ to 30¢	30%

Worrall's Brick and Plastering.  
Cleves' Angle Trowel. # gro. No

No. 2, \$80; No. 3, \$15.	net @ 10%
Garden.....	70%
<b>Trucks, Warehouse, &amp;c.</b>	
B. & L. Block Co.'s list.....	40%
Barnes' Barrel Trucks.....	40%
Daisy Stove Trucks, Improved pattern.	
	\$ dos. \$18.00
Thompson Mfg. Co. ....	40%
<b>Tubes, Boiler—</b>	
See Price	

## Twine— Flat Twine

No. 9,	and	2	Balls.....	22	89
No. 12,	and	2	Balls.....	18	24
No. 13,	and	2	Balls.....	17	20
No. 24,	and	2	Balls.....	17	20
No. 38,	and	2	Balls.....	16	19
Chalk Line, Cotton,	2	Balls.....		17	
Cotton Mops, 6, 9, 12 & 15 m to doz.,	15¢	to 17¢			
Cotton Wappings, 5 Balls to	2	13¢	to 14¢		

2-Ply Hemp,  $\frac{1}{2}$  and  $\frac{3}{4}$  B BALLS  
Twine).....1

3-Ply Hemp, 1 lb Balls.....	10¢@10¢
3-Ply Hemp, 1½ lb Balls.....	10¢
2, 3, 4 and 5 Ply Jute, ¼ lb Balls.....	8¢
Mason Line, Linen, ¼ lb Balls.....	5¢
No. 204 Mattress, ¼ and ½ lb Balls, 52¢@54¢	
Paper.....	10¢@11¢
Wool.....	5¢@6¢

**Vises—**

Solid Box.....	50¢@10¢@60¢
----------------	-------------

### Parallel-

Backus and Union.....	40
Bonney's.....	50
Double Screw Leg.....	15
Fisher & Norris Double Screw.....	15
Hollands'.....	35
Howard's.....	40
Massey Quick Action.....	20
Merrill's.....	15
Millers' Falls.....	40
Moore's.....	20
Parker's.....	20

Prentiss..... 50¢-10¢

Sargent's.....	70¢10¢70¢10¢10¢
Simpson's Adjustable.....	40¢
Stephens'.....	25¢30¢
Trenton.....	40¢50¢40¢10¢
Wilson's.....	55¢

**Saw Filers—**

Bonney's, Nos. 2 & 3.....	40¢10¢50¢
Economy, # dom., Nos. 110.....	10¢10¢ 120
115.....	50¢10¢10¢

Hopkins'..... 7 doz \$  
Reading

Stearns' Common, Nos. 0, 1, 2 & 3	50
Stearns' Rubber Jaw, Nos. 10 & 33	33 1/2
Wentworth	20 & 10
<b>Miscellaneous—</b>	
Bauer's Pipe Vises	10
Cincinnati	25 & 10
Cowell Hand Vises	20
Enterprise Pipe Vises	each \$3.00, 40
Massey Combination Pipe Vise	40
Phoenix Vises	33 1/2

Phoenix Hand Vises... 7 doz \$

Wads—Price Per M.	
U.M.C.&W.R.A.—B.E., 11 up..	68¢
U.M.C.&W.R.A.—B.E., 9¢10..	82¢
U.M.C.&W.R.A.—B.E., 8.....	96¢
U.M.C.&W.R.A.—B.E., 7.....	\$1.10
U.M.C.&W.R.A.—P.E., 11 up..	1.15
U.M.C.&W.R.A.—P.E., 9¢10..	1.50
U.M.C.&W.R.A.—P.E., 8.....	1.70

Dis. 30 & 2%

U.M.C.&W.R.A.—P. E., 7 .....	1
Eley's B. E., 11 and larger.....	\$

**Wagon Boxes—**  
See Boxes, Wagon.

**Wagon Jacks—**  
See Jacks, Wagon.

**Ware, Hollow—**  
Cast Iron, Hollow

Stove Hollow-Ware—  
Ground ... ..60&10@6

Unground.....	85¢10¢70¢5¢
Gray Enameled Ware—	
Stove.....	50¢50¢5¢
Maslin Kettles.....	60¢10¢80¢10¢
Bollers and Saucepans..	40¢5¢40¢10¢
White Enameled Ware—	
Maslin Kettles.....	70¢10¢75¢5¢
Bollers and Saucepans.....	60¢60¢10¢
Rustless Hollow Ware.....	50¢50¢10¢

Tinned Boilers and S'pans ....6

**Enameled—**  
Agate and Granite Ware, list Jan. 1, 1894.....25  
Ironclad Enameled Ware, Old list.....50&100

**Kettles—**  
Galvanized Tea-Kettles—  
Inch..... 6      7      8      9  
                 1      2      3      4

Steel Hollow Wa

Avery Spiders and Griddles	60, 10 & @ 70
Avery Kettles.....	60 & 10 & @ 70 & 10
<b>Standard Fiber—</b>	
	Per Doz.
	Plain, Decorated
Cuspidors.....	\$7.50
Half-peak Measure.....	\$3.00
Peak Measure.....	3.50

Spittoons, "Daisy," 8 in. 8.50

Wash-Basins, 10 1/2 in.....	1.80	2.00
Wash-Basins, 12 in.....	2.00	2.50
See also Pails.		
<b>Indurated Fiber.—</b>		
Basins, Ringed, 7 doz., No. 2.....	1.60	
Butter Bowls 16, 17 and 19-inch (8 pieces), 7 nest.....	\$1.50	
Keelers Nested, Nos. 1, 2, 8 and 4 (4 nest, 28 nest.....	\$2.55	

Liquid Measures, pt., qt., & qt

funnell (4 pieces), 7 set.....	\$1.20
Spittoons No. 2, 7 doz.....	\$1.80
Washtubs, Nested, Nos. 0, 1, 2, and 3 (4 pieces), 7 nest.....	\$5.75

See also Falls.

**Silver Plated, Hollow-**  
4 mo. or 5¢ cash in 30 days.  
Meriden Britannia Co. .... 40¢  
Reed & Barton. .... 40¢  
Rogers & Brothers. .... 40¢  
Simpson, Hall, Miller & Co. .... 40¢  
Hartford Silver Plate Co. .... 40¢  
William Rogers Mfg. Co. .... 40¢

**Washers-**  
Size hole. .... 5-16 3/4 1/2 3/4 1 1/2 1 3/4 2 1/4  
Washers. .... 5/4 4 3 2 1 1/2 1 1/4  
In lots less than 2000, 1/2¢ add 1/4¢, 1/2¢  
boxes 1¢ to list.

**Whips**  
American Whip Co. Length. 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 ft.  
X. L. Whalshone Driv'n. .... \$18.00 20.00 22.00 24.00 27.00 30.00 33.00 36.00  
Buckra, Two-thirds Whalshone. .... 15.00 16.50 18.00 20.00  
Bull Bone, Half-length Whalshone. .... 11.00 12.00 13.00 15.00  
American Standard. .... 8.00 8.50 9.50 10.50 12.00 13.50 15.00 16.50  
True Grip, Raw Hide Center. .... 6.00 6.00 6.50 7.00 7.50 9.00  
New Name, Stocked Java, Black and Wine Colors. .... 6.00  
American, 98 Pen Whip. .... 6.00  
Gents' Light Driving No. 111. .... 6.00  
Gents' Light Driving No. 106. .... 5.00  
Hand-made Stocked Java No. 108. .... 3.75 4.00  
A large variety of cheaper grades. .... 50¢ to \$3.00  
Team Whips. .... 2.00 to \$7.50  
Toy Whips. .... 10¢ to \$1.00  
Hardware Assortment, 10/American 3/4 Whips for \$50.00. .... \$ gro. \$2.50 to \$13.00

**Wire and Wire Goods-Iron**  
Br. & Ann. Nos. 0 to 18. .... 75¢ to 10¢  
Cop'd. Nos. 0 to 18. .... 75¢ to 10¢  
Galv., Nos. 0 to 18. .... 75¢ to 10¢  
Tin'd. List, Nos. 0 to 18. .... 70¢ to 10¢  
Extra 5¢ to 10¢ often given and low net prices often made on large lots.

**Washer Cutters-**  
See Cutters, Washers.  
**Water Coolers-**  
See Coolers, Water.  
**Wedges-**  
Iron. .... 1/2¢ to 1/4¢  
Steel. .... 1/2¢ to 1/4¢  
**Weights Sash**  
Ton lots at foundry, 15¢. 15.00 to 16.00  
**Well Buckets Galvan.**  
See Pails, Galvanized.  
**Wheels Well-**  
8 in. \$2.00; 10 in. \$2.50; 12 in. \$2.75

Galvanized Fence. .... 75¢ to 10¢  
Main's An'led & Tin'd on Spools. .... 60¢ to 5¢  
Main's Brass and Cop. on Spools. .... 50¢ to 5¢  
Steel Music Wire, 12 to 30, imported. .... 60¢ to 70¢  
Stubs' Steel Wire. .... \$8.00 to 2.30¢  
Tate's Spooled, Tin'd & Annealed. .... 60¢ to 5¢  
Tate's Spooled Cop. and Brass. .... 50¢  
Tin'd Broom Wire, 12 to 21, 1/2¢. .... 4¢  
Wire Clothes Line. .... 1¢  
Wire Picture Cord, see Cord.

**Bright Wire Goods-**  
Standard List. .... 90¢ to 90¢ to 15¢

**Wire Cloth and Netting-**  
Galvanized Wire Netting. .... 80¢ to 80¢ to 10¢ to 5¢  
Painted Screen Cloth 100 ft \$1.45 to \$1.60

**Wire Barb-**  
See Trade Report.

**Wire Rope-See Ropes, Wire.**

**Wrenches-**  
American Adjustable. .... 40¢ to 40¢ to 10¢  
Baxter's Adjustable "g". .... 40¢ to 10¢ to 5¢  
Baxter's Diagonal. .... 60¢ to 60¢ to 10¢  
Coe's Genuine. .... 50¢ to 50¢ to 10¢  
Coe's "Mechanics". .... 50¢ to 10¢ to 5¢  
Girard Standard. .... 55¢ to 10¢ to 70¢  
Lamson & Sessions' Engineers'. .... 60¢ to 10¢  
Lamson & Sessions' Standard. .... 70¢ to 10¢  
Lamson & Sessions' Agricultural. .... 75¢ to 10¢ to 10¢  
P. S. & W. Agricultural. .... 80¢ to 5¢  
W. B. Diamond. .... 50¢ to 50¢ to 10¢  
Acme, Bright. .... 50¢ to 50¢ to 10¢

Acme, Nickeled. .... 40¢ to 40¢ to 5¢  
Aiken's Pocket (Bright). .... \$2.50 to \$2.60  
Alligator. .... 60¢ to 60¢ to 10¢  
Always Ready. .... 33¢ to 10¢ to 40¢ to 5¢

**Bemis & Call's:**  
Adjustable S. .... 35¢ to 5¢  
Briggs' Pattern. .... 50¢ to 10¢  
Combination Black. .... 40¢ to 5¢  
Combination Bright. .... 40¢ to 5¢  
Cylinder or Gas Pipe. .... 45¢ to 5¢  
Extra Heavy. .... 45¢  
Merrick's Pattern. .... 45¢  
No. 3 Pipe Bright. .... 55¢  
Bit Wrench, Adj., Tatum's. .... 25¢ to 10¢  
Boardman's. .... 30¢ to 30¢ to 5¢  
Cincinnati Brace Wrenches. .... 20¢ to 10¢  
Diamond Steel. .... 55¢ to 5¢  
Donohue's Engineer. .... 20¢ to 10¢  
Eagle. .... 60¢ to 10¢  
Hercules. .... 70¢ to 10¢  
Tetter Vise Wrench. .... 55¢ to 10¢ to 5¢  
The Favorite Pocket. 1/2 doz \$4. .... 40¢ to 40¢ to 5¢  
Walker's. .... 55¢ to 5¢  
Webster's Pat. Combination. .... 25¢

**Wringers, Clothes-**  
In lots of less than one dozen.  
Am. Wringer Co.'s List July 2, '94. 2¢ cash  
Colby Wringer Co., List May 1, '94. 2¢ cash  
Lovell Mfg. Co., List July 2, 1892. 2¢ cash  
Peelers & Co., List Feb. 1892. 2¢ cash  
National Wringer & Mfg. Co., List June 1, 1892. .... 2¢ cash

**Wrought Goods-**  
Staples, Hooks, &c., List, March 17, 1892. 85¢ to 25¢ to 85¢ to 30¢

# Paints, Oils and Colors.—Wholesale Prices.

**Animal and Vegetable Oils-**  
Linseed, City, raw. per gal. 54¢ 55¢  
Linseed, City, boiled. 57¢ 58¢  
Linseed, Western, raw. 53¢ 54¢  
Lard, City, Prime. 53¢ 54¢  
Lard, City, Extra No. 1. 52¢ 53¢  
Lard, City, No. 1. 51¢ 52¢  
Lard, Western, prime. 52¢ 53¢  
Cotton-seed, Crude, prime. 26¢ 28¢  
Cotton-seed, Crude, off grades. 26¢ 28¢  
Cotton-seed, Summer Yellow, prime. 30¢ 32¢  
Cotton-seed, Summer Yellow, off grades. 30¢ 32¢  
Sperm, Crude. 60¢ 62¢  
Sperm, Natural Spring. 65¢ 67¢  
Sperm, Bleached Spring. 65¢ 67¢  
Sperm, Natural Winter. 70¢ 72¢  
Sperm, Bleached Winter. 70¢ 72¢  
Whale, Crude. 40¢ 42¢  
Whale, Natural Winter. 45¢ 47¢  
Whale, Bleached Winter. 45¢ 47¢  
Whale, Extra Bleached. 47¢  
Sea Elephant, Bleached. 47¢  
Winter. 25¢ 26¢  
Menhaden, Crude, Sound. 25¢ 26¢  
Menhaden, Crude, Southern. 25¢ 26¢  
Menhaden, Light Pressed. 30¢ 31¢  
Menhaden, Bleached W'ter. 35¢ 36¢  
Menhaden, Extra Bleached. 37¢ 38¢  
Tallow, City, prime. 43¢ 45¢  
Tallow, Western, prime. 43¢ 45¢  
Cocoanut, Ceylon. 54¢ 56¢  
Cocoanut, Cochin. 74¢  
Cod, Domestic. 34¢ 36¢  
Cod, Foreign. 35¢ 37¢  
Red Elaine. 36¢ 38¢  
Red Saponified. 44¢ 46¢  
Bank. .... 28¢ 30¢  
Straits. .... 29¢ 31¢  
Olive, Italian, bbls. 58¢ 60¢  
Neatsfoot, prime. 60¢ 65¢  
Palm, prime, Lagos. 84¢ 86¢

**Paints and Colors-**  
Barytes, Foreign, 10 ton. \$22.00  
Barytes, Amer. floated. 20.00  
Barytes, Amer. No. 1. 16.00  
Barytes, Amer. No. 2. 13.00  
Barytes, Amer. No. 3. 11.00  
Blue, Celestial. 6¢ 8¢  
Blue, Chinese. 4¢ 5¢  
Blue, Prussian. 25¢ 40¢  
Blue, Ultramarine. 25¢ 40¢  
Brown, Spanish. 14¢ 1¢  
Brown, Vandyke, Amer. 3¢ 3 1/2¢  
Brown, Vandyke, English. 6¢ 8¢  
Carmine, No. 40, in bulk. 2.00  
Carmine, No. 40, in boxes. 2.10  
Carmine, No. 40, in ounce bottles. 8.00  
Chalk, in bulk. 1 ton. 1.75  
Chalk, in bbls. 100 lb. 38¢ 40¢  
China Clay, English. 1¢ ton. 13.00  
Cobalt Oxide, prep'd. 9.00  
Cobalt Oxide, black. 10.00  
Cobalt Oxide, black, lots 100 lb. 1.90  
Cobalt Oxide, black, less 100 lb. 1.96  
Green, Paris, in bulk. 23¢  
Green, Paris, 170 to 175 lb. 23¢  
Kegs, Paris, small pack. 25¢ 20¢  
Rebates. 3¢ 1/2¢ on lots of 10,000 lb or over; 2 1/2¢ on 4000 to 10,000 lb; 2¢ on 2000 to 4000 lb; 1 1/2¢ on 1000 to 2000 lb; 1¢ on 500 to 1000 lb purchased during the season.  
Green, Chrome, ordinary. 6¢ 12¢  
Green, Chrome, pure. 22¢ 25¢  
Lead, Eng. B.B. white. 7¢ 8¢  
Lead, Ann. White. 4 1/2¢ 4 1/2¢  
Dry. 8¢ 8 1/2¢  
In Oil. 5 1/2¢ 6 1/2¢  
Lead, White, in oil, 25 lb tin pails, add to keg price. 1¢ 1/2¢  
Lead, White, in oil, 12 1/2 lb tin pails, add to keg price. 1¢  
Lead, White, in oil, 1 to 5 lb assorted tins, add to keg price. 2¢

Lead, Red, bbls. and 1/2 bbls. 5 1/2¢ 5 1/2¢  
Lead, Red, kegs. 5 1/2¢ 5 1/2¢  
Litharge, kegs. 5 1/2¢ 5 1/2¢  
Litharge, bbls. and 1/2 bbls. 5 1/2¢ 5 1/2¢  
Ocher, Rochelle. 1.35 1 1/4¢  
Ocher, French Washed. 1 1/4¢ 2 1/4¢  
Ocher, German Washed. 1 1/4¢ 1 1/4¢  
Ocher, American. 7 1/2¢ 8¢  
Orange Mineral, English. 10¢ 10 1/2¢  
Orange Mineral, French. 10¢ 10 1/2¢  
Orange Mineral, German. 7 1/2¢ 8¢  
Orange Mineral, American. 7 1/2¢ 8¢  
Red, Indian, English. 6¢ 15¢  
Red, Indian, American. 9¢ 14¢  
Red, Turkey. 7¢ 10¢  
Red, Venetian, American. 1.10 1.35  
Red, Venetian, English. 1.10 1.35  
Sienna, Italian, Burnt and Powd. 4¢ 5¢  
Sienna, Ital., Burnt. 1 1/4¢ 5 1/2¢  
Sienna, Ital., Raw, Powd. 4 1/2¢ 5 1/2¢  
Sienna, Ital., Raw, Lumps. 1 1/4¢ 5 1/2¢  
Sienna, American, Raw. 1 1/4¢ 5 1/2¢  
Sienna, American, Burnt and Powd. 1 1/4¢ 5 1/2¢  
Talc, French. 1 1/4¢ 1 1/4¢  
Talc, American. 1 1/4¢ 1 1/4¢  
Terra Alba, F.C.H. 100 lb. 65¢ 75¢  
Terra Alba, English. 65¢ 75¢  
Terra Alba, American No. 1. 65¢ 75¢  
Terra Alba, American No. 2. 45¢ 50¢  
Umber, Turkey, Burnt and Powd. 2 1/2¢ 3 1/2¢  
Umber, Turkey, Raw and Powd. 2 1/4¢ 3 1/4¢  
Umber, Turkey, R.W. Lumps. 2 1/4¢ 3 1/4¢  
Umber, Turkey, Bnt. Amer. 1 1/4¢ 1 1/4¢  
Umber, Turkey, R.W. Amer. 1 1/4¢ 1 1/4¢  
Yellow, Chrome. 11¢ 12¢  
Vermilion, American Lead. 23¢ 25¢  
Vermilion, Quicksilver, bulk. 44¢  
Vermilion, Quicksilver, bags. 44¢  
Vermilion, Quicksilver sm'r pks. 52¢  
Vermilion, English Import. 55¢ 60¢  
Vermilion, Imitation, Eng. 8¢ 30¢  
Vermilion, Trieste. 90¢ 95¢  
Vermilion, Chinese. 85¢ 1.00  
Whiting Common, 100 lb. 40¢ 45¢  
Whiting Gliders. 50¢ 55¢  
Zinc, American, dry. 3 1/4¢ 4 1/4¢  
Zinc, French, Red Seal. 7¢ 7 1/2¢

Zinc, French, Green Seal. 8 1/4¢ 10¢  
Zinc, French, V. M. X. 7¢ 7¢  
Zinc, Antwerp, Red Seal. 6¢ 6 1/2¢  
Zinc, Antwerp, Green Seal. 6 1/2¢ 7 1/2¢  
Zinc, German, L. Z. O. 5¢  
Zinc, V. M. in Poppy Oil, G. Seal, lots of 1 ton and over. 10 1/4¢  
Zinc, V. M. in Poppy Oil, Red Seal. 10 1/4¢  
lots of less than 1 ton. 10 1/4¢  
Discounts. French Zinc. Discounts to buyers of 10 bbl. lots of one or assorted grades, 1 1/2¢; 25 bbls., 2 1/2¢; 50 bbls., 4 1/2¢. No discount allowed on less than bbl. lots.

**Colors in Oil-**  
Black, Drop, Frankfort. 25¢ 30¢  
Black, Drop, English. 12¢ 15¢  
Black, Drop, Domestic. 7¢ 10¢  
Black, Lampblack, Best. 20¢ 30¢  
Black, Lampblack, Common. 7¢ 15¢  
Black, Ivory. 5¢ 13¢  
Blue, Chinese. 35¢ 45¢  
Blue, Prussian. 20¢ 45¢  
Blue, Ultramarine. 12¢ 18¢  
Brown, Vandyke. 8¢ 13¢  
Green, Chrome. 8¢ 13¢  
Green, Paris. 16¢ 18 1/2¢  
Sienna, Raw. 7¢ 14¢  
Sienna, Burnt. 7¢ 14¢  
Umber, Raw. 7¢ 10¢  
Umber, Burnt. 7¢ 10¢

**Putty-**  
In barrels and 1/2 bbls. 0.11¢ 0.11¢  
In tubs. 0.11¢ 0.11¢  
In tin cans. 0.11¢ 0.11¢  
In bladders. 0.11¢ 0.11¢

**Spirits Turpentine-**  
In regular bbls. 30¢ 31¢  
In machine bbls. 31¢ 31¢

**Glue-**  
Low Grade. 7¢ 9¢  
Cabinet. 11¢ 14¢  
Medium White. 12¢ 14¢  
Extra White. 16¢ 20¢  
French. 10¢ 23¢  
English. 10¢ 18¢  
Irish. 10¢ 12 1/2¢

# THE IRON AGE.

The oldest paper in the world devoted to the interests of the Hardware, Iron and Metal Trades, and a standard authority on all matters relating to those branches of industry.

## RATES OF SUBSCRIPTION: INCLUDING POSTAGE.

### UNITED STATES AND BRITISH AMERICA.

Weekly Edition, Issued every THURSDAY MORNING. .... \$4.50 a year.  
Semi-Monthly Edition, First and Third THURSDAYS of every month. .... 2.30 "  
Monthly Edition First THURSDAY of every month. .... 1.15 "

### ALL OTHER COUNTRIES.

Per Annum, Postpaid.  
Weekly Edition: \$5.00=£1=25 francs=30 marks=11 florins=6 roubles (coin)=25 lire=50 pesetas.  
Semi-Monthly Edition: \$2.50=10/=12 1/2 francs=10 marks=6 florins=3 roubles (coin)=12 1/2 lire=10 pesetas.  
Monthly Edition: \$1.25=5/=6 1/4 francs=5 marks=3 florins=1 1/2 roubles (coin)=6 1/4 lire=5 pesetas.

## RATES OF ADVERTISING: ONE SQUARE (12 LINES, ONE INCH)

ONE INSERTION. .... \$2.00  
ONE MONTH. .... 7.50  
THREE MONTHS. .... 17.50  
SIX MONTHS. .... \$30.00  
ONE YEAR. .... 50.00

Rates for larger spaces quoted on application.

**New York (Main Office),** 96-102 Reade Street,  
**Philadelphia,** 220 South Fourth Street,  
**Pittsburgh,** Room 509, Hamilton Building.  
**Chicago,** 59 Dearborn Street, cor. Randolph,  
**Cincinnati,** Rooms 22-24 Pickering Building,  
**St. Louis,** Bank of Commerce Building,  
**Boston,** 146 Franklin Street,  
**Cleveland,** 312 The Cuyahoga.

**BRITISH AGENCY:** Office of The Ironmonger, 42 Cannon St., London.

**AUSTRALIAN OFFICES:** Melbourne, 231 Elizabeth St.; Sydney, 3 Wynyard St.

Remittances should be made by draft, payable to the order of DAVID WILLIAMS, on any banking house in the United States or Europe, or by P. O. Money Order on New York. When these cannot be obtained, postage stamps of any country will be received. Newsdealers or Booksellers in any part of the world may obtain The Iron Age through The American News Company, New York, U. S. A. The International News Company, New York, U. S. A. and London, England; or The San Francisco News Company, San Francisco, Cal., U. S. A. Entered at the Post Office, New York, as Second-Class Matter.



---

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

<https://books.google.com>

